


Iron Age

NATIONAL METALWORKING WEEKLY

August 7, 1952


CONTENTS PAGE 2

1




Nothing Rolls Like a Ball. It is nature's favorite, strongest form. Having no ends, it rolls freely in any direction.

2




Its inherent resistance to load is greatly increased by curved raceways which, under load, are partly filled by an arc of the ball. "Point contact" talk is the bunk. Actually, its contact is an ellipse, like this:

3




This is how a ball resists thrust (axial loads) as well as radial loads—like a bicycle on a banked track.

4



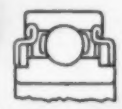
Put two rows of balls together, and you can support thrust and radial loads from any direction. They may be in one single bearing or in two separate bearings.

5



Unlike other types of rolling elements, the ball need not be forced to travel in the proper direction. Function of separator is merely to keep balls spaced. Contact is in region of poles (point of slowest rotation—least friction.)

6



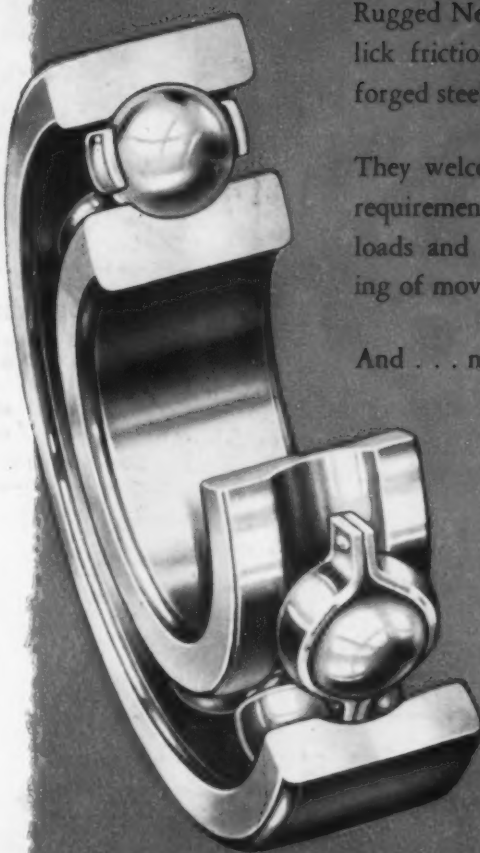
Only ball bearings may be self-sealed with integral closures of felt and metal. In average conditions New Departures are lubricated for life. Other type bearings cannot maintain precise "interfitment" needed to maintain efficient self-sealing.

The bare facts about Ball Bearings

Rugged New Departure Ball Bearings lick friction with free-rolling, tough, forged steel balls.

They welcome today's more exacting requirements of higher speeds, heavier loads and *continued* precise positioning of moving parts.

And . . . most important of all, New Departure, world's largest ball bearing maker, meets your particular problems with a vast fund of experience and *original thinking*.



Cut-away view of
New Departure
Ball Bearing

Nothing Rolls Like a Ball...

NEW DEPARTURE

BALL BEARINGS

Farval never overlooks a bearing in lubrication of Swinging Coiler

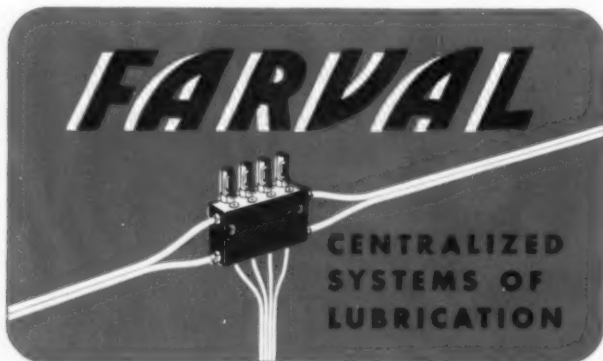
THE rough and tumble treatment which thick-gauge metal alloys impose on coilers calls for a truly modern centralized lubricating system—calls for never-miss Farval.

As every bearing on the Torrington 4-housing Swinging Coiler (at right) plays a vital and exacting role in the looping of tough metal coils, each one needs individual and proper lubrication. Hit and miss, half-blind hand oiling invites bearing trouble and expense as well as costly down time. So this 65-year-old Connecticut company protects the machines it builds with Farval Centralized Lubrication. Its engineers say, "Farval overlooks no bearings, saves lubricating time and proves a valuable sales feature appealing to our customers."

In steel mills, metal working plants and manufacturing establishments of all kinds, both at home and abroad, Farval Centralized Lubrication is protecting millions of industrial bearings.

Farval is the original Dualine system of centralized lubrication that has proven itself through 25 years of service. The Farval valve has only 2 moving parts—is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble. Through its full hydraulic operation, Farval unfailingly delivers grease or oil to each bearing—as much as you want, exactly measured—as often as desired. Indicators at every bearing show that each valve has functioned.

For a full description, write for Bulletin 25. The Farval Corporation, 3252 E. 80th Street, Cleveland 4, Ohio. *Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers, Ltd.*



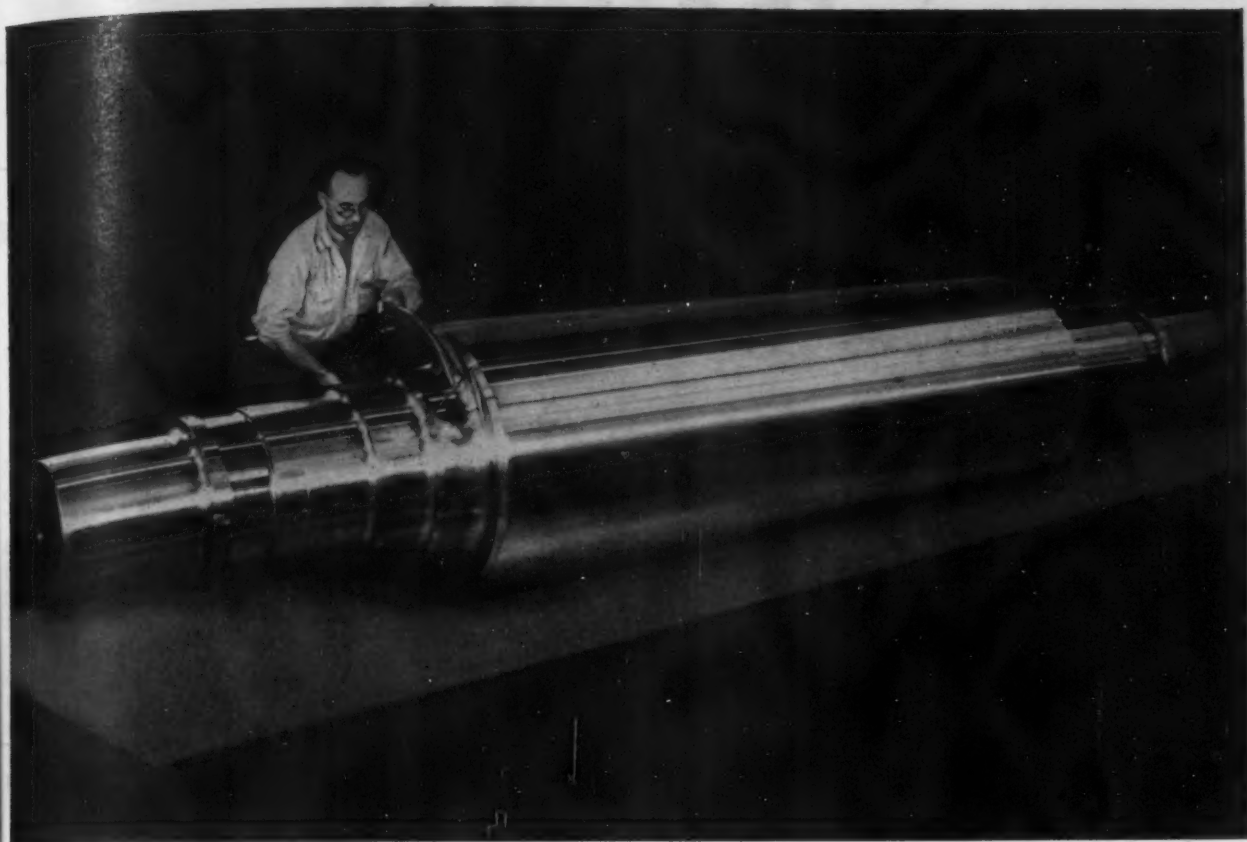
**FARVAL—Studies in
Centralized Lubrication**

No. 136



KEYS TO ADEQUATE LUBRICATION—*Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.*

Illustration of 4-Housing Swinging Coiler by courtesy of The Torrington Manufacturing Company



21 Tons of Hardened Steel Roll

Here's a big forged roll of the type produced so frequently at Bethlehem. Note the gleaming finish, the beautiful contours. Building a hardened steel roll of this sort takes a special kind of craftsmanship.

The big fellow weighs better than 21 tons. Its overall length is 120 in. But Bethlehem makes many smaller types of rolls, too . . . some so small that they look like pygmies alongside this giant.

Whatever your needs in hardened steel rolls, you'll find Bethlehem an always-dependable source. We furnish them in a complete range of sizes for the cold-

rolling of sheet, strip, tinplate, etc. All, of course, are shaped and finished to customer specifications.

Bethlehem invites your inquiries on these products. One of our engineers will be glad to call whenever he can help you work out details.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA,
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast
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IRON AGE

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THE IRON AGE

DIGEST

of the week in metalworking

STEEL INDUSTRY PROFITS SLUMP IN STRIKE

PAGE 65
Sheer drops in earnings because of strike trouble were suffered by steel companies in the second quarter. With this came radical declines in production, shipments, and taxes paid to the government. Iron Age estimates steel loss at 19 million tons. Raw materials supply is seen as adequate.

TENTATIVE COST GUIDE FOR STEEL USERS

PAGE 67
OPS may take another week or two before permitting price rises on specific steel products. Meanwhile the best cost guide for the anxious consumer is the schedule of increases recommended by industry to OPS. Chances are the schedule listed by Iron Age will be similar to the final order.

HOW THE TIN SHORTAGE WAS LICKED

PAGE 68
What happened to save millions of dollars worth of perishable foods from rotting on the ground because of a strike-engendered tin can shortage? A Washington plan and cooperation of tinplate producers went into effect swiftly and saved the day. It called for complex shuffling of supply.

FREIGHT CAR BUILDING PROGRAM SLOWED

PAGE 70
Railroad car building is failing to meet the goals established 2 years ago. Class 1 roads have added only 40,000 cars in that period. Target was 240,000 new freight cars. The railroads claim insufficient steel was allotted for the program, but DTA blames reluctance in placing orders.

GETTING WILL BE TOUGHER FOR OIL PIPE

PAGE 71
Users of oil country pipe must put a hitch in their belts for the rest of 1952. A full quarter of tubular goods production was lost during the long steel strike, estimates Petroleum Administration for Defense. Drilling may fall 9000 wells short of goal. Some conversion pipe may be had.

AUTOMAKERS STILL SNAGGED BY STEEL WOES

PAGE 86
Detroit was only half-heartedly happy over the end of the steel strike. Automakers were still rooted in trouble. It would take 3 weeks before the steel industry could return to full output. Meanwhile Detroit was writing off as lost a quarter's production. Many thousands stayed unemployed.

WILL DEFENSE TOOL BUSINESS DECLINE?

PAGE 98
Although machine tool builders can expect heavy defense business for another 2 years or so, ratio of war work to civilian orders will decline steadily. That's how things look to National Machine Tool Builders' Assn. F. S. Blackall, Jr., NMTBA chief, said defense work has too many variables.

HOW TO SET UP A HEAT TREAT DEPARTMENT

PAGE 109
Starting from scratch, Teer, Wickwire & Co., Jackson, Mich., contract machine shop, set up a modern heat treating department capable of processing a high volume of steel parts requiring exceptionally close control. On a 5-day, 2-shift week, they handle up to 175 tons of parts a week.

AUTOMATICS FOR FAST SHEETMETAL WORK

PAGE 114
Warmed up production schedules for more and bigger planes have put the heat on sheetmetal departments at Glenn L. Martin Co., Baltimore. Assembly lines are getting more accurate and bigger parts faster from big automatic forming machines. Many manual operations are eliminated.

LESS PAINT WITH ELECTROSTATIC SPRAYING

PAGE 116
More chairs per gallon of paint is the record for electrostatic spraying at American Fixture & Mfg. Co., St. Louis. Paint, fed to a rotating head, is transformed into a spray of fine, charged particles. These are attracted to grounded parts rotating past the heads on a conveyor.

SEE LONG TANGLE IN STEEL DISTRIBUTION

PAGE 157
No matter what orders the government issues a long tangle in steel distribution is seen. Only top output by the mills can ease the pressure and speed orderly distribution. CMP tickets won't mean much until lost defense output has been made up. First quarter turning point is expected.

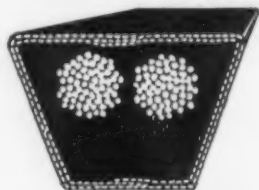
HOW TO USE CO₂ IN GRINDING CARBIDES

NEXT WEEK
Experiments with CO₂ as a coolant in toolroom grinding convinced Thompson Products Co. and Cadillac Cleveland Tank Plant that the new coolant is here to stay. Carbides can be ground faster with fewer heat cracks and less wheel wear. A central system distributes CO₂ at Thompson.

RESEARCH KEEPS

B.F. Goodrich

FIRST IN RUBBER



**B. F. GOODRICH
GROMMET V BELT**



Where B. F. Goodrich grommet belts are outlasting others 2 to 1

B. F. Goodrich grommet V belts cut costs 20 to 50%

THOSE nine belts run a sand pump 10 hours a day, 6 days a week. Ordinary V belts had to be stretched extra tight in order to run the heavy pump. In addition to causing bearing wear, the tight fit pressed sand into belts and pulley, resulting in serious wear on both. When B. F. Goodrich grommet V belts were installed, it was found they gave good gripping action, even though not tightened. With belts running at less tension, abrasive wear was cut way down, belt and pulley life doubled, and heavy bearing wear in the motor eliminated. Here's the reason B. F. Goodrich grommet V belts outperform ordinary belts:

No cord ends—A grommet is endless, made by winding heavy cord on

itself to form an endless loop. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength—All of the cord material in a B. F. Goodrich grommet multiple-V belt is concentrated in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

Better grip, less slip—Because a grommet is endless, a grommet V belt is more flexible, grips the pulleys better. Size for size, grommet multiple-V belts will give $\frac{1}{3}$ more gripping

power, pull heavier loads with a higher safety factor.

Only B. F. Goodrich has the grommet!—No other multiple-V belt is a grommet V belt (U. S. Patent No. 2,233,294). Now available in C, D and E sections. See your local B. F. Goodrich distributor. *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio* (available in Canada).

Grommet V Belts BY
B.F. Goodrich
RUBBER FOR INDUSTRY

The Aftermath

NOW that the strike is settled the steel industry—large and small firms—will pay through the nose. So will the workers but they seem not to know it.

Steel users—large and small—will be forced to meet the wage pattern laid down in the steel settlement. They will pay higher prices for steel; many will be unable to obtain higher prices for their products even though they get "permission" to try.

Steel leaders did not want a wage increase; they did not want a price increase. They knew the pattern would be forced on their customers; they knew their customers would have a tough time price-wise; and they knew a steel wage and price increase would mean higher prices for goods and services purchased by the steel industry.

It is a sad commentary on the state of the nation that steel leaders' hands were tied—tied by an amazingly one-sided WSB; by unprecedented union power; and by Harry Truman who three times publicly went all out for the steel union. The steel industry was licked on the economic issue before it started to fight.

It won the battle to preserve the right of workers to their jobs without compulsory union membership. For that we can be thankful. But steel lost the fight to stem the sixth wage round—a round that will reverberate throughout industry.

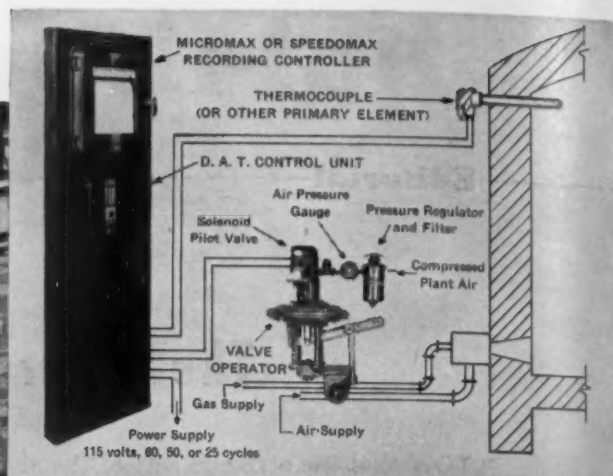
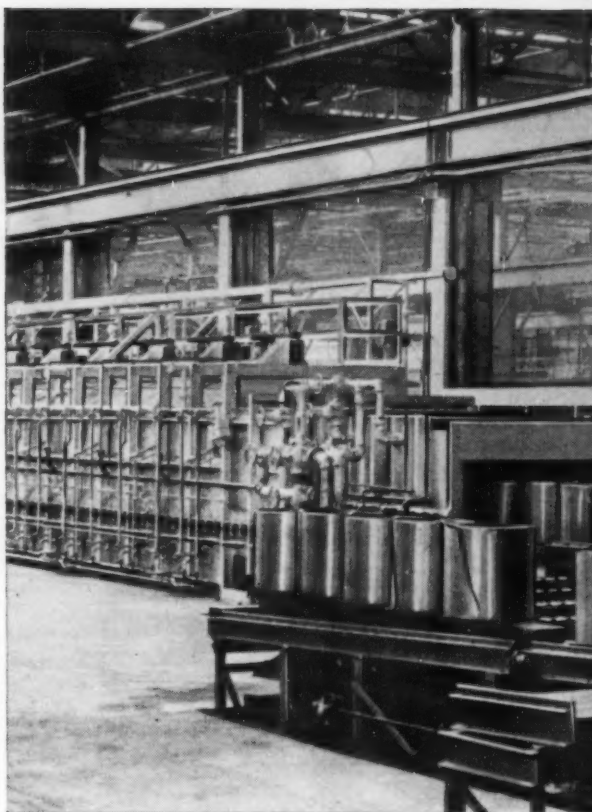
Now, John L. Lewis and other labor leaders will try to outdo Phil Murray, just as he outdid their last bout. Part of the wage and price spiral stems from a deep and bitter competition among various labor chiefs. Business, the workers and the public pay the tab for this reckless and silly ride down the road to oblivion.

Today the crying need is for labor statesmen, not labor leaders. Without a government crutch Philip Murray is a potential labor statesman. If we don't get one soon, business, which has survived the sixth wage round, may collapse on the seventh or eighth—and surely on the tenth or twelfth.

If this race goes on, the value of the dollar will drop further into the cellar. By that time the white collar class will be close to economic extermination: the so-called middle class will become a figment of our imagination: and the pensioned and retired will be thrown into a hopeless state of cheap dollar bondage with only the grim reaper to relieve them.

Tom Campbell

Editor



THIS "package" OF CONTROL FITS ITSELF TO FURNACE NEEDS ... and only L&N can supply all its features!

• Scovill Manufacturing Company credits pyrometric control of their 119-foot annealing furnaces with a big part in helping to produce the most uniform, high-quality brass they've ever made. Each furnace anneals sheet in 2000 lb. coils and has a capacity of 32,500 lbs. per hour. The four furnaces were built by Surface Combustion Co. and The Electric Furnace Co. for Scovill's 10 million dollar continuous strip mill.

Scovill's success in controlling temperatures is timely because it shows what can be done with thousands of other industrial furnaces. Small units may need only one instrument, instead of Scovill's five per furnace.

But the principle is the same.

Instead of arbitrarily turning fuel "on" at a predetermined low temperature, and "off" at a predetermined high, D.A.T. alternately turns heat on and off—flexibly adapting the periods of on-time to the needs of the furnace. When temperature begins to rise above the set-point, the periods of on-time become shorter. When temperature falls, periods of on-time grow longer. In this way, D.A.T. exactly adapts its action to the upsets, load changes and lags of the furnace. This means it holds temperature in line for all normal changes in

furnace charge, ambient temperature, temperature control point, etc.

Increased production resulting from unusual uniformity is the great advantage of D.A.T. but other points are worth remembering:

Fuel can often be saved because less heat is lost up the stack.

Valve and burner sizes are not particularly critical.

D.A.T. can often modernize an old furnace, because it's so easy to install.

D.A.T. operates equally well on furnaces of full-muffle, semi-muffle, open firing and conventional radiant-tube design.

D.A.T. is just one of several L&N Controls. Call us for service or information in selecting equipment for any temperature-control problem. Address nearest office or 4956 Stenton Ave., Philadelphia 44, Penna.

LEEDS & NORTHRUP

Instruments • automatic controls • furnaces

Jrl. Ad N-33A-626(7)

THE IRON AGE

Dear Editor:

Letters from readers

Radiant Heating

Sir:

In the Oct. 18, 1951, issue of *THE IRON AGE*, an article appeared on radiant heating. Mr. W. V. Packard was responsible for the story, and we wondered if he might be able to supply us with further information.

We have a client who produces flexible metal hose and we are interested in determining possible use of his product in radiant heating.

We noticed a statement in Mr. Packard's article, to the effect that bending and welding account for a large share of installation costs, when steel pipe is used in radiant heating, and this aroused our interest.

We would appreciate receiving a copy of Mr. Packard's story and we would be grateful if he would expand the subject, giving us more details about the industry, the type of pipes or ducts employed, and the installation.

In addition, are there figures on usage? How widespread is radiant heating, and what is the estimated future use of this type of heating system?

M. DANNENBAUM

John Falkner Arndt & Co., Inc.
Philadelphia

Editorial Orchid

Sir:

I wish to compliment you in your selection of editorial staff for your Chicago Office. As a subscriber, Ingersoll Products Div. of Borg-Warner Corp., and personally, the assistance given upon request is appreciated.

Mr. Keith Bennett, of the Chicago staff, was of great help to me recently in compiling a list of steel companies producing during the late strike and companies which effectuated settlements during the strike period.

Again my thanks to *IRON AGE*.

R. L. CLARK

Ingersoll Products Div.
Borg-Warner Corp.
Kalamazoo, Mich.

Aluminum Coated

Sir:

In your June 12 issue of *THE IRON AGE*, we read with much interest your article "Complex Parts Easily Coated with Aluminum," by W. G. Patton.

We would appreciate your sending us a reprint of that article.

L. H. SACHS

Chemical Unit
Lockland Plant Laboratory
Aircraft Gas Turbine Div.
Cincinnati

Giant Presses

Sir:

We understand that sometime within the last year an article appeared in *THE IRON AGE* concerning large forging equipment in the United States.

This article is said to have listed the forging presses of 15,000 tons and larger now in production in the United States and summarized the proposed equipment of this class.

The writer would very much like to read this article and will appreciate your furnishing the date of *THE IRON AGE* in which it appeared.

C. H. SAVERY

French & Hecht Div.
Kelsey-Hayes Wheel Co.
Davenport, Iowa

Article appeared in Apr. 3 issue, p 85; tearsheets sent.—Ed.

Titanium Alloy

Sir:

We would appreciate it very much if you would send us a copy of an article which appeared in your publication entitled "Titanium Alloy Development Mapped" by W. Rostoker and H. D. Kessler, on p. 136, June 19 issue.

R. C. STROKER
Assistant Metallurgist

Barber-Colman Co.
Rockford, Ill.

Safety

Sir:

May we have the privilege of reprinting, with credit of course, "Safety: How About Your Plant?" which appeared on p. 76 of your May 8 issue.

M. FRIEDLANDER
Editor

The Foreman's Digest
Mystic, Conn.

Permission granted.—Ed.

Iron Powder

Sir:

Would it be possible for you to send me a tear sheet copy of the article "Five Ways to Make Iron Powder," by B. T. du Pont and R. Fulton, which appeared in the April 24, 1952 issue of *THE IRON AGE*?

R. J. BROWN

Ketchum, MacLeod & Grove, Inc.
Pittsburgh

Jet Engines

Sir:

We would like a tear sheet of a recent article from your July 10 issue, "Jet Engines Push Welded Molybdenum Study."

A. BROOKS

Sperry Gyroscope Co.
Great Neck, New York

use
dependable

Pheoll
SCREWS, BOLTS,
NUTS

TO HELP END
ASSEMBLY
PROBLEMS



WIDE SELECTION
MEETS MOST NEEDS

The fact that so many manufacturers find there are Pheoll stock fasteners that meet exact needs—makes Pheoll stocks the one source for you to depend on, too. Our wide range of sizes, metals and finishes simplifies assembly problems; speeds production—because fasteners that fit, make jobs go faster!

ADEQUATE STRENGTH
MEANS BETTER
COMPLETED PRODUCTS

Pheoll rolled threads and cold formed heads provide maximum structural strength to meet stress and strain. Snug thread mating surfaces assure greater contact with more lasting grip—adding life and service to your assembled products.

FINE FINISH
IMPROVES YOUR
PRODUCT APPEARANCE

The extra fine head and thread finish of Pheoll quality fasteners improves the salability of your product. They help "dress up" the job! You can select from a wide variety of attractive head types in screws for metal, wood and plastics—nuts with single or double chamfer in various metals and finishes.

Write for Additional Information and Price List.

MAKE PHEOLL YOUR SOURCE FOR: Sems† • Thread Cutting Screws† • Threaded Rods • Wood Screws† • Machine Bolts • Cap Screws • Stove Bolts† • Thumb Screws • Machine Screws†

†Furnished in slotted and Phillips Recessed Head Types

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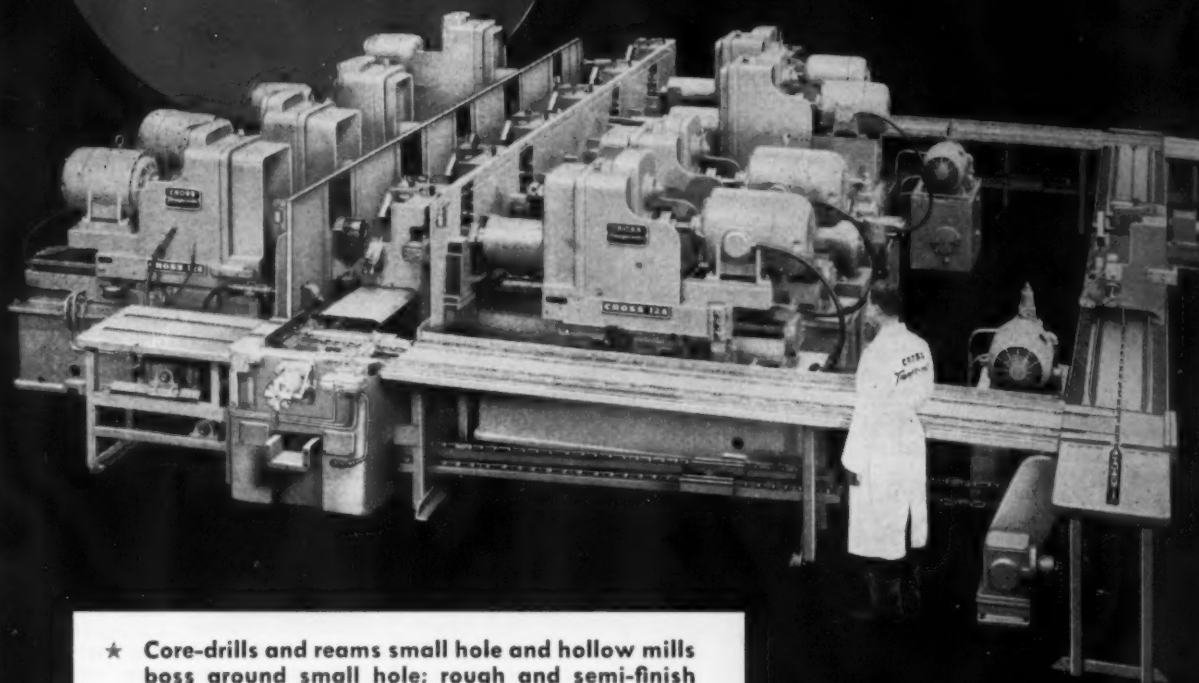
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Industrial Fasteners and Fastener Services

**Bores,
Hollow Mills
and Trepan
Tank Idler Arms**

Another Transfer-matic by Cross



- ★ Core-drills and reams small hole and hollow mills boss around small hole; rough and semi-finish bores large hole and trepans groove on one end.
- ★ Cast Armor material—Rockwell C-36.
- ★ Six and one-half pieces per hour at 100% efficiency.
- ★ Six stations—one for loading, five for machining—with automatic transfer from station to station.
- ★ Palletized work holding fixtures hold part securely for all operations with integral conveyor returning fixtures from last station to loading station.
- ★ J.I.C. standard electrical and hydraulic construction with stranded wire.
- ★ Pre-set tools and Cross Cutter-Drive reduces downtime.



Established 1898

THE **CROSS** CO.
DETROIT 7, MICHIGAN
Special MACHINE TOOLS

Fatigue Cracks

by Charles T. Post

Up in Smoke

Little did we dream when we heard about the steel strike settlement that it would go up in smoke so soon.

As we hear it, Ben Fairless and Phil Murray had everything settled at the famous White House conference when Ben noticed Phil smoking a cigarette and offered him a cigar.

"Don't care if I do," said Phil expansively. Then, after a few puffs, "Not bad at all. What kind is it?"

"Kind I always smoke," beamed Ben. "I'll send you a box."

And so he did. When Ben walked into the Steel Workers Union Wage Policy Committee, gathered to approve the settlement, he had a box of cigars under his arm, made the presentation on the spot.

Don't be surprised if you find them made a part of all future steel labor agreements.

F.F.J.

"As a recent subscriber to IRON AGE I note your frequent repetition of 'your f.f.j.' and to date I have been unable to figure out what those letters stand for," writes J. J. Moore, The Dominion Gas Meter Co., London, Ont. "Perhaps others among your new subscribers are also wondering what your abbreviation stands for."

Because your f.f.j. has gathered more new subscribers into the fold this year than any previous year in modern history, it may be timely to give the initiates the password—if the loyal older members of the lodge will pardon us.

Your f.f.j., Brother Moore, is your favorite family journal. Many a man is still alive who remembers toddling with mama to the post office to pick it up, later gathering it in himself on his way back from the saloon with suds for father, getting his first job by virtue of the education he gained reading it, quoting it learnedly to impress his best girl, rising through the business ranks of an important metal-working concern through the superior knowledge absorbed through its pages, and, finally, as a top tycoon, guiding his empire with your f.f.j. at his elbow. Custom being what it is in this part of the world, we've never heard of it being laid away in the casket. The Bard talked about the seven ages

of man, but there's only one IRON AGE, your favorite family journal, and that lasts through all seven.

Apronym

Next thing you know, some of the new readers are going to get up enough courage to ask what an "apronym" is. We always thought the word was coined, with due respect to the Greek, by Franklin P. Adams, but we just checked Mrs. McDonald's dictionary, and by golly, there it was: "A surname indicative of an occupation [Humorous]."

You don't find many people who see anything funny about their names, but there are plenty around who apparently are subconsciously lured to a job that fits. J. D. Haas, U. S. Bedding Co., Memphis, writes: "A salesman from the Caine Steel Co. of St. Louis, Mo., made a call on us the other day—his name is Rod W. Key, and this name seems most appropriate for a steel salesman."

Overworked

We noted in the paper the other day that there are at least four pretty and unattached girls for every man at Miami Beach this season. One hotel executive said, "Frankly all these surplus girls are shaping up into a real problem."

"The girls have been complaining plenty," he added, "but there's only a limited amount the management can do for them."

Puzzlers

The trapper in last week's puzzler got his information from the third Indian who was a Crow.

We had many answers to the last cow-grazing problem but unfortunately most of them were wrong. C. B. Smith, Portland Copper & Tank Wks. and C. H. Goff, Barber-Colman Co., were the only ones to get the right answer of 89,598 sq ft.

A. Romeo, Denison Engr. Co., has sent his solution to the triangle puzzle of several week's ago.

Mr. Romeo sent this one in a few weeks ago: In a 440 yard race John gives Joe a 5 yard start and beats him by 3½ seconds. They run the race again and this time John gave Joe a 5 second start and loses by 11 yards. How fast can John and Joe run?

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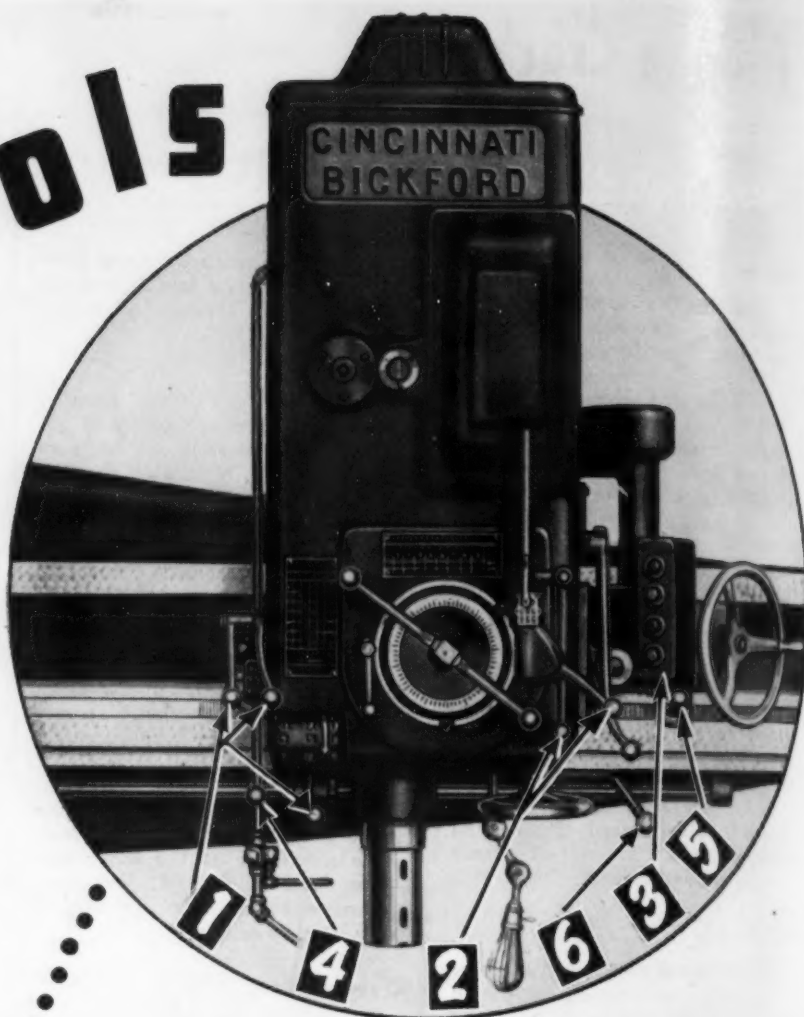
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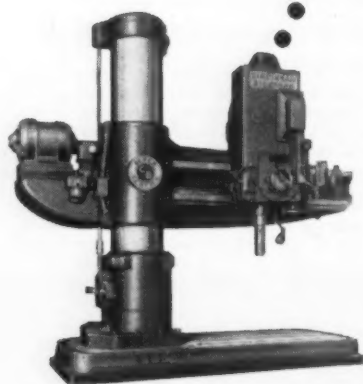
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THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio U.S.A.

THE IRON AGE Newsfront

► Fourth quarter steel is a gone duck. One large mill in the Midwest reports it will open its books for fourth quarter orders in the very near future—and close them the same day. The mill (like others) simply does not have capacity available.

Mills are having trouble convincing old customers they just don't have steel to sell. Sales managers are emphasizing repeatedly that it will take a while to get top quality steel, and they have a host of top-priority orders to wade through.

► The Air Force is backing development of titanium applications with hard cash. It has made available \$1.5 million to Boeing for research and development of titanium applications on aircraft. Most will go into the XB-52. About \$180,000 is earmarked for purchase of titanium, mostly in the form of alloy sheets. This is the first time the Air Force has given any company money for titanium development.

► One dream possibility of the Pitt Consol "fuel cell" method of turning coal directly into electricity may be the one-pot aluminum reduction line. This would enable fabricators, foundries to produce their own metal—truly a small business plant. It depends on the physical size and economic requirements of the unit, so far the big unknowns in the process.

► A portable device for determining drawing quality of cold reduced sheet and strip has been developed. Determination is based on resistance to bending. The test is non-destructive and fast. It is expected to find widespread use in steel mills and stamping plants.

► The Russians have made considerable progress in use of aluminized steel. It is being used extensively in MIG fighters we have encountered over Korea.

► The iron ore shortage next spring may not be as severe as at first expected. U. S. Steel hopes to maintain satisfactory supply by shipping about 2 million tons by rail. It shipped more than that by rail last winter. Part of the loss will be made up by new ships coming into service and by heavier loading made possible by high water level in the Great Lakes. Fall weather is still a potent factor.

► South Korea has undertaken expansion of its tungsten mines which should double output by next May. All production is exported to the U. S. (Latest figures show our tungsten imports from Korea second only to those from Portugal). Since important mines aren't too far from present line, another long retreat apparently is not contemplated.

► A 49-in. Sendzimir mill has been purchased by U. S. Steel Co. The mill will be installed at the Vandergrift (Pa.) Plant and will be used to roll stainless steel sheets.

► Although die castings have lost some ground in front grilles, they are moving steadily ahead in other automotive applications. On the positive side are ornaments of all types, decorative trim and lettering and, more recently, transmission housings and garnish moldings for side and rear windows. Die cast motor blocks are also a very strong possibility for the near future.

► British firms winning St. Lawrence Seaway contracts will get government allocations of steel and other scarce materials. The priority is intended to prevent British firms from losing contracts due to extended delivery. A group of leading UK firms is being formed to compete for contracts.

Challenging

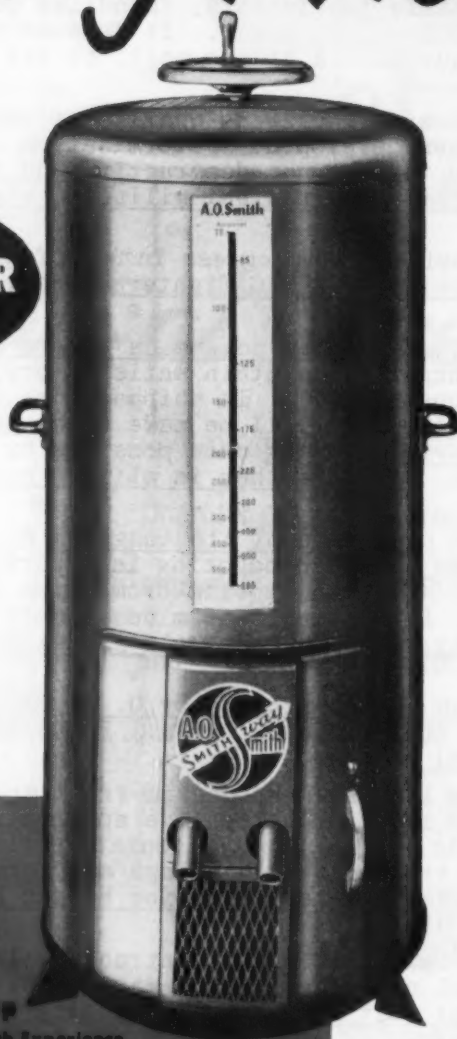
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STEEL: Earnings Take Nosedive in Strike

Strike cuts second quarter net . . . Many reports delayed . . .
Government tax take dipped further than industry profit
. . . See adequate raw material supply—By W. V. Packard

Steel companies reversed their record breaking trend in the second quarter and suffered sharp declines in earnings. The reason, of course, was labor trouble. After two short shutdowns in April, the long strike started June 2 and lasted until July 24.

In addition to the decline in earnings, production and shipments suffered radical drops. Tax payments to the government were a lot smaller, too.

U. S. Steel, which accounts for about one-third of the industry, was not able to give a detailed report of its second quarter operations. Its financial report was delayed because accountants who usually do the statistical job are members of the CIO. Reports of a number of other companies were also delayed.

Paid Regular Dividend — Ben Fairless, U. S. Steel chairman and president, pointed out that the company earned sufficient profit to pay its regular dividends—despite the fact that second quarter operations averaged only 60 pct of capacity. It does not follow that the company's breakeven point is substantially below that figure because subsequent revision of tax estimates may change the picture.

Eugene Grace, Bethlehem Steel chairman, reported his company earned \$5,378,685 in second quarter of '52, compared with \$18,926,045 in the first quarter and \$23,623,770 in the second quarter of 1951. Bethlehem operated at 63.5 pct of rated capacity during the quarter.

Government Loss Higher — An interesting sidelight revealed by

the financial reports is that the government lost more money from the steel strike than the steel companies did. The government's tax "income" from Bethlehem came to \$5.3 million during the second quarter, compared with \$31 million during the first quarter, and \$38.7 million during the second quarter of last year. Compare these figures with the company's income totals in the preceding paragraph.

Since the strike did not end until July 24 and steelmaking operations will be hampered for a month after that, third quarter operations will also be affected. However, it is expected that third quarter results will be a little better than those of the second quarter.

Because of production losses (THE IRON AGE estimates the total to be 19 million net tons of ingots) steel officials expect a tight market through the rest of this year. Some expect the high pressure from consumers to continue through the first quarter of next year.

Tightest items listed are special alloys needed for defense, bars, heavy plates and tinplate. The last named will probably ease as soon as the canning peak has passed.

Enough Ore—The ore shortage late next winter may not be as bad as had been expected. Both U. S. Steel and Bethlehem said they expected their supplies to be adequate—despite the long tie-up of shipments during the strike. They gave three reasons: (1) Addition of new ships, (2) high water level on the Lakes which permits heavier loading, and (3) smaller tonnage needed because little was consumed during the strike. A tight squeeze is still expected, and all-rail shipments will be made.

Scrap is reported in good supply, and no fears were voiced on that score.

Steel expansion programs were delayed by about 3 months by the strike. At U. S. Steel's Fairless Works (now about 65 pct completed) jurisdictional disputes among AFL unions have added to the delay caused by the strike. The huge plant will be in partial operation this fall, but won't be completed until mid-1953.

Steel Company Earnings Reported

Company	Second Quarter '52	First Quarter '52	First Half '52	First Half '51
Bethlehem Steel	\$5,378,865	\$18,926,045	\$24,304,730	\$48,694,975
Armco Steel	6,550,752	8,014,634	14,565,386	20,644,703
Inland Steel	4,408,590	6,936,470	11,345,060	17,513,098
Pittsburgh Steel	-347,220**	748,111	400,891	4,011,173
Barium Steel	.....	.....	1,317,723	3,135,123
Lukens Steel	.....	.....	1,697,543*	3,388,963*
Detroit Steel	533,447†	.....	2,043,188	6,822,366
Granite City Steel	.....	.....	1,380,194	3,039,106
Alan Wood Steel	374,521	411,538	786,079	1,393,797
Rotary Electric	.....	.....	747,410	1,339,308
The Midvale Co.	.....	.....	612,839	647,714
Continental Steel	406,940	353,072	760,012	1,048,833
McLouth Steel	.....	.....	1,484,698	2,654,471
Eastern Stainless	.....	.....	432,248	648,255
Copperweld Steel	390,858 ¹	452,067	842,925	1,655,186

* Three quarters of fiscal year, ending July 5.

† Gives effect of \$183,000 tax credit.

¹ Includes \$271,816 tax credit for 1951. ** Net loss.

STEEL: Can Bitterness Be Ended?

Fairless, Murray to work for better union-management relations . . . Joint plants tours should help, but not overnight . . . New contract strengthens union security—By J. B. Delaney.

Can Phil Murray and Ben Fairless raise the standards of industrial relations in the steel industry?

They can and probably will. Both have a sincere desire to do

contract and the headaches that are peculiar to its administration.

Not Overnight—The skeptics have a point. Sixteen years of continual haggling over interpreta-



PEACE PIPE: CIO President Phil Murray (left) accepts that box of cigars from Ben Fairless, U. S. Steel chairman, as David MacDonald, CIO secretary-treasurer, watches. (See P. 11)

so. Both are tired and sick at heart over recurring strikes that hurt the workers, the industry, and the public.

Mr. Fairless, president and chairman, U. S. Steel Corp., and Phil Murray, president of the steelworkers union, are planning to take off next month on a "good will" tour of U. S. Steel plants to talk with the workers.

Skeptics argue that nothing will be changed by this tour. They say that the mechanics of industrial relations in the industry still rest in the hands of the same people down the line on both sides—the people who "live" with the

tion of agreements, management rights, incentives, grievances and the like are not conducive to improved relations. This is something that cannot be changed overnight.

But a closer relationship between Mr. Fairless and Mr. Murray could be the starting point for the simple reason that the thinking of the top men in the union and the industry is bound to be reflected in the actions of those down the line.

Mr. Fairless proposed the tour of U. S. Steel plants. Mr. Murray agreed. Apparently the two men intend to make their visits as in-

formal as possible. Just seeing them together at the same table should do a lot to dissipate some of the strike bitterness.

Better Way—"There must be a better way to handle labor-management relations than by just slugging it out," Mr. Fairless said.

One of the biggest stumbling blocks to peaceful industrial relations in steel is the union's apparent fear that if the opportunity ever presents itself the industry will try to "break" the union.

This was evident in the union's willingness to prolong the strike in an effort to win the "union shop," which, in a nutshell, is another word for union security.

Coal:

Lewis - Moses talks enter second week, but both parties stay mum.

Bargaining over terms of a new soft coal contract has entered its second week in Washington, but neither Harry Moses nor John L. Lewis is prepared to show his hand.

Mr. Lewis, spokesman for 475,000 mineworkers, and Mr. Moses representing Bituminous Coal Operators Assn., are shooting for final agreement on terms of their new operating contract before the Sept. 20 deadline.

Car Shortage—Government solid-fuels experts, meanwhile, urged coal consumers to stock up on coal now to avoid possible future shortages.

They based their advice to buy on the prospective shortage of railroad coal cars.

In Illinois, the Progressive Mine Workers union has served a similar 60-day contract termination notice.

That union says it wants a 10 pct wage boost and a 20¢ per ton increase in the royalty fund. That would bring total royalty payments to 50¢ per ton.

It is not believed that Mr. Lewis is asking this much for his United Mine Workers. Current glut of coal stocks throughout the industrial east, plus unemployment in many soft coal areas, have weakened the UMW leader's hand.

PRICES: What Steel Rises May Be

Steel consumers will have to wait another week or two before they get the official information they are waiting for on steel price increases. It will probably be that long before Office of Price Stabilization issues a detailed order listing permitted increases on specific products. Meanwhile, the best cost guide for the anxious consumer is the increases recommended on specific products by industry representatives who conferred with OPS officials the early part of last week.

It is not enough for the steel user to know that the average price increase will be \$5.20 per ton or about 4.7 pct. He wants to know how much the specific items he uses will be raised. This is the key to his cost picture.

Chances are the industry recommendations will be close to the detailed price order finally issued by OPS.

Meanwhile, the steel consumer is in the position of buying something without knowing how much it costs. OPS has issued a preliminary order which sets July 26 as the effective date of the steel price increase and authorizes producers to ship steel without billing. Billing at higher prices will be made after the detailed order is issued. Industry recommendations follow:

Carbon Products

Ingots	\$2.00
Blooms, Billets & Slabs—Forging	4.50
Blooms, Billets & Slabs—Re-rolling	3.00
Blooms and Billets—Shell	4.50
Seamless Pipe, Tube Blooms & Billets	3.00
Skelp	4.00
Tube Rounds	5.50
Wire Rods	4.50
Structural Shapes Inc. Bearing Piles	4.00
Sheet Piling	4.50
Plates—Sheared UM & Floor	4.00
Rails—60# and under per linear yd	5.00
Rails—over 60# per linear yd	3.50
Track Spikes	10.00
Joint Bars	4.50
Tie Plates	5.50
HR Bars & Special Bar Sections	5.00
Concrete Reinf. Bars—Unfab.	5.00
Cold Finished Bars	7.50
Tin Plate—Electrolytic .....	.25 per base box
Tin Plate—Hot Dip .....	.25 per base box
Black Plate .....	.25 per base box
Terne Plate .....	.25 per base box
Hot Rolled Sheets	3.50
Cold Rolled Sheets	4.50
Enameling Sheets	5.50
Galvanized Sheets (Formed Roofing, Siding & Valley, Ridge & Flashing) ..	5.50
Long Terne & all other coated	5.50
Electrical Sheets—Pole	3.50
Electrical Sheets—Field	12.00
Hot Rolled Strip	4.50
Hoops, Baling Bands and Cotton Ties ..	8.00

Standard & Line Pipe

Buttweld—Black P. E.	650 (3¼ pts.)
Black T & C	7.00 (3¼ pts.)
Buttweld—Galv. P.E.	7.00 (3¼ pts.)
Galv., T&C	7.50 (3¼ pts.)
Seamless Lapweld & Electric Weld Black	
2"–4" Nom. P. E.	10.50 (5¼ pts.)
2"–4" Nom. T&C	11.00 (5¼ pts.)
5" Nom. and over P. E.	6.00 (3 pts.)
5" Nom. and over T&C	6.50 (3¼ pts.)
Seamless Lapweld & Electric Weld Galvanized	
2"–4" Nom. P. E.	11.00 (5¼ pts.)
2"–4" Nom. T&C	11.50 (5¼ pts.)
5" Nom. and over P. E.	6.50 (3¼ pts.)
5" Nom. and over T&C	7.00 (3¼ pts.)

Oil Country Goods—Seamless, Electric Weld & Lapweld

Casing (F-25; H-40; J-55)	6.50
N-80 Carbon & Deepwell	9.00

Tubing H-40; F-25; J-55	\$11.00
Drill Pipe—Grade D	11.00
Drive Pipe	6.50
Misc. Tubular—Couplings	33.00
Seamless & Welded Mechanical & Pressure Tubing	5.5% on base price

Drawn Wire

Acme Spring; Basic & Bessemer; Box Binding; Buckle; Con Key; Chain; Check Rower; Clothes Pin; Coat Hanger; Scrapless Nut; Link; Split Rivet; Tubular Rivet; Tuning Pin; Wood Screw; Welding; Strand Wire; Tying Wire; Wool Wire; Pear Shape; Square; Nail Wire; Pump; Stapling, Bright All Other; Bale Tie Cross Head Wire; Bale Tie Wire; Baling Wire; Merchant Qual. Galvd. Annld.; Premier Spring...7.50

Steel Wage-Price Ratio

Steel industry price recommendations apply the \$5.20 per ton increase to carbon and some standard alloy steel products on the basis of man-hour production cost of each product. Basis used is the OPS average of 20 man-hr per ton of steel output. Dividing the price increase of \$5.20 by average man-hr (20) yields an average breakdown per man-hr of 26¢.

That's just about the cost of the wage package. But it doesn't leave room for Capehart, freight and other cost increases. On this basis it looks as if the steel industry will be absorbing direct cost increases to the tune of something more than \$3.70 per ton of steel produced. Past experience shows that indirect costs in the form of higher prices of goods and services purchased will mount to about \$8.90 per ton.

All Other Wire ..4.7% of base price & extras	
Nails—Cut and Wire	\$9.00
Staples	8.00
Wire Tacks	22.00
Woven Fence	9.00
Welded Fence	14.00
Wire Netting	14.00
Fence Posts, Commonly Produced	
by Steel mills	8.00
Wire Bale Ties—Coil and Loop	9.00
Barbed & Twisted Wire	8.00
Wire Reinforcing Mesh—Welded Precast ..	14.00
All other wire reinforcing mesh	7.50
Chain Link Fabric	10.00
Ornamental Fence & Trellis, Commonly produced by steel mills	8.00
Tubular Fence Posts & Fence Rails, Commonly made by steel mills	7.00
Wire Rope & Cord	31.00
Guard Rail Strand	15.00
Strand (other than guard rail)	16.00
Wire Hoops	8.00
Clothes Line	10.00
Steel Hardware Cloth	

4.7% of base price & extras

Steel Screen Cloth. 4.7% of base price & extras

Cold Rolled Strip

Low Carbon	9.00
High Carbon	17.00

High Strength—Low Alloy

Ingot, Blooms, Billets and Slabs	4.50
Hot Rolled Bars	7.50
Structural Shape	6.00
Plates	6.00
Hot Rolled Strip	7.00
Hot Rolled Sheets	5.50
Cold Rolled Sheets	7.50
Galvanized Sheets	8.50
Cold Rolled Strip	15.00

Alloy & Stainless Steel Products

Alloy	
Ingots	3.00
Blooms, Billets & Slabs	6.00
Wire Rods	6.00
Structural Shapes	7.50
Plates	10.00
Hot Rolled Bars	7.50
Cold Finished Bars	12.00
Hot Rolled Sheets	12.00
Cold Rolled Sheets	12.00
Electrical Sheets—all alloy grades	12.00
Hot Rolled Strip	12.00
Cold Rolled Strip (to be detailed later) ..	37.50
Wire	12.00
Tubing—N-80	14.00
Drill Pipe—Grade E	12.37
Casing—N-80 (Alloy)	9.00

Mechanical Tubing

Schedule J—Hot, Cold	5.0% of base price
J—Bearing—Hot, Cold	6.0% of base price
K—Aircraft—Cold	3.0% of base price

Pressure Tubing

Schedule B-2 Hot, Cold	4.7% of base price
B-3 Hot, Cold	5.0% of base price
All other alloy including carbon and alloy tool steels but excluding high strength-low alloy	4.7% of base price

Stainless Steel ...4.7% of base price & extras

FOOD: Tin Can Shortage Beaten

Threat to perishable food crops averted by concerted action . . . Loss of 20 million cases, \$200 million, was real danger . . . Master plan saved the day—By J. B. Delaney.

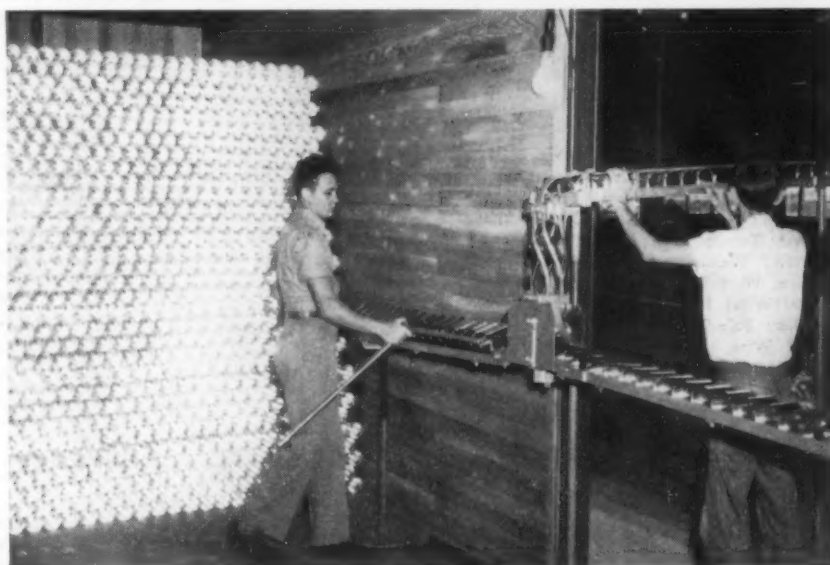
When the American housewife reaches for a can of food at the grocer's this winter she'll find one there—thanks to a lot of guys she'll never know.

Full story of the battle to save perishable food crops threatened by the long steel strike may never be known. But little by little it is becoming apparent that this was one of the most dramatic as-

How It Worked—What happened to transform potential disaster into minor damage was this:

When it became apparent that can makers' inventories had dwindled to the danger point, National Production Authority, Dept. of Agriculture, can companies, canners, and farm groups went into action.

NPA made a survey of tinplate



IN PRODUCTION: Tin cans coming off the line at Continental Can Corp.

pects of the strike and the period immediately afterward.

It is a story of an order of battle mapped out weeks before the strike ended. Split-second execution of that plan saved the day for hundreds of farmers by minimizing losses that potentially were tremendous. Only a week before the strike settlement, the industry visualized a loss of \$200 million.

Even with the end of the strike, it looked as though a loss of 20 million cases of perishable foods then ripening in farmers' fields was a certainty. But everyone now agrees that actual loss will be only a fraction of that amount.

stocks in struck steel plants and warehouses. It came up with a figure of around 100,000 tons of finished stock that could be shipped readily. U. S. Steel had 35,000 tons, Jones & Laughlin 12,000 tons. The one producer still in operation was directed to divert his output into tinplate suitable for canning perishable foods. Methods of speeding tinplate production once the strike ended were explored. An appeal was made by NPA to the striking United Steel Workers of America to free tinplate before the strike ended, but this was ignored.

Meanwhile, Agriculture Dept. and the other groups were calling

the public's attention to the threat. They had a problem there. They did not want to start a spree of "scare" buying by the public, but at the same time they saw the need for bringing pressure on top government officials, the striking union, and the steel producers to work out a prompt settlement. These groups are now convinced that this pressure was a major factor in ending the strike.

In Action—Once the strike was called off, the battle plan was put into effect. Special trainloads of tinplate were expressed from Pittsburgh district plants to the West Coast (See p. 95) and other farm areas where the threat was greatest. Crops in most danger were tomatoes all over the country, fruits in California, and string beans. Some consideration was given to flying tinplate to particularly critical areas. But this was not necessary. Some export plate was diverted to home use.

Since the strike ended, can companies have been working three shifts. This will continue until the threat is completely alleviated. All orders for tinplate must be certified for use exclusively for the perishable food pack. Major tinplate producers have been directed to reserve all tinplate for use of food canners.

It is estimated that stocks of strike-bound tinplate now moving to the can companies will keep production going for 10 days to 2 weeks. By that time newly-produced plate will be arriving.

Diversion Advised—Manufacturers of tinplate are being advised by National Production Authority to divert all "in-process" hot-dipped plate produced through Aug. 15 to food canneries.

Although all hot-dipped tinplate remains under strict government control for the U. S. food pack, certain types (unsuitable for food preservation) of secondary tinplate, electrolytic plate, and blackplate in the process of manufacture may be released to the customers who ordered it, or it may be exported.

MACHINE TOOLS: Productivity Up

Labor needs per unit declined 3 pct from 1949 to 1950 . . . Competition for skilled workers a problem . . . Factors vary from plant to plant . . . Standardization programs paid off.

Worker time per unit in the production of machine tools dropped an average of 3 pct from 1949 to 1950, according to just-released figures from Bureau of Labor Statistics. Greater total output was the prime factor, with dollar volume growing from \$241 million in 1949 to \$303 million in 1950. An even greater drop in man-hours per unit was prevented by the shortage of skilled labor and the required training of new men.

Indirect labor dropped 4.5 pct while direct labor per unit dipped only 2.5 pct. This is the usual case with indirect labor. Direct labor was reduced as a result of many small improvements in methods and larger lot production. Some plants went to greater subdivision and, hence, higher productivity.

Labor Competition — Early in 1950 the hiring of skilled labor was not difficult—but when the Communists crossed the 38th parallel the labor market tightened. Employment of production workers in machine tool plants zoomed from 39,000 to 51,000 in the second half and many inexperienced people were hired near the end of 1950. Competition for workers was indicated by a jump in the quitting rate—0.6 per 100 per month in 1949 to 2.2 per 100 per month in the latter part of 1950.

Labor needs for most individual machine types declined and, generally, indirect labor per unit was cut more for those tools which had the greatest production increases. Direct labor per unit showed little relation to output volume changes of individual types.

Not General — Factors varied from plant to plant. A third of the companies polled moved against the general trend and for two of these companies the increase in unit man-hours exceeded 15 pct.

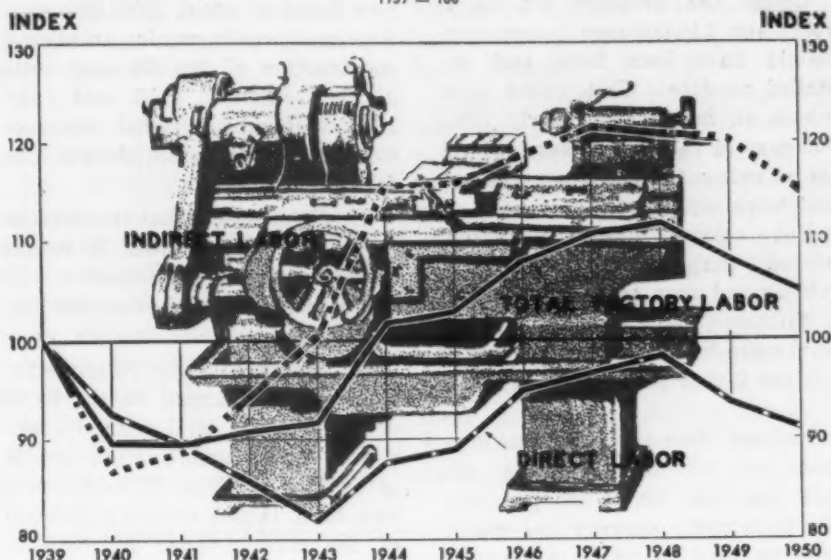
Greatest reductions appeared in the firms employing the highest ratio of indirect labor, a large

plant and a few cases where large capital expenditures for new equipment had been made. Simplification and parts standardization programs also seemed to pay off in reduced labor by about 6 pct.

In 1950, the proportion of indirect to total labor varied from under 10 pct to over 60 pct in the industry. Half the firms used from 30 to 50 pct indirect labor.

TRENDS IN MAN-HOURS EXPENDED PER UNIT

Selected Machine Tools, by Type of Labor
1939 = 100



Unit Man-Hours, by Type of Tool and Labor

Type of Machine Tool	Type of Labor					
	Total Factory Labor		Direct Labor		Indirect Labor	
	1950	1949	1950	1949	1950	1949
(1939 = 100)						
All reported tools	104.9	107.9	91.1	93.5	115.2	120.3
Boring machines	92.5	91.0	83.5	81.5	103.0	102.6
Drilling machines	78.9	85.6	78.7	80.4	85.9	98.2
Lathes	119.1	130.3	102.3	114.0	147.9	160.0
Milling machines	118.1	109.5	84.1	82.9	141.2	122.8
Shapers	92.9	92.6	92.0	91.5	94.9	94.9
(1945 = 100)						
Automatic screw machines	98.4	119.2	90.0	108.3	111.7	138.8
Grinding machines	111.6	108.1	121.6	115.3	89.8	91.5

CARS: Building Program Bogs Down

Railroad car building failing to meet goal . . . Class I roads add only 40,000 cars in 2 years . . . Blame steel shortage . . . DTA knocks reluctance in car ordering—By A. K. Rannells.

What has happened to the freight car program, intended to increase capacity not only for handling increased defense production but also averting any threats of shortage?

Under the program set up 2 years ago, 240,000 new freight cars should have been built and installed to date. This would have meant an increase of nearly 120,000 cars in railroad ownership, after allowing for retirement of old and worn out cars.

But seldom has the output neared the 10,000-car-a-month rate agreed upon as a target. Class I railroads have increased their ownership by only 40,000 cars during the 2-year period.

Bogged Down—Both government and industry are free to admit that the ambitious program has been sadly sagging and might now be said to be in a bogged-down stage.

Both also agree that there is no shortage when measured against current requirements. Instead, there actually has been a small surplus in recent weeks because of the steel strike and a 30 pct failure in spring farm crops.

This is beside the point—in the eyes of Defense Transport Administration. Defense production has not yet reached its peak and non-defense production has been choked for lack of raw materials.

In addition, it is DTA's job to see to it that there are freight cars enough to handle all emergencies, big and small, as well as current requirements—even if this means stockpiling.

Need More—Troubled by the lagging program, DTA recently took another look and concluded that the goals must be revised still further—and upward.

Full mobilization needs, said DTA, would require a total rolling stock of 2,167,000 cars—with 1,867,000 of this total in the hands of Class I roads.

Class I railroad ownership is now listed at about 1,765,000 cars. New goal would require an overall construction of 296,500 new units between January, 1952, and July, 1954, with an additional construction of 142,500 units during the following year.

This means also that the current target of 10,000 units a month would have to be increased to 11,000 a month on and after October of this year.

Defense Production Administration has gone ahead on the basis of the revised goal with its approval of tax amortization certificates. Through Mar. 31, certificates had been issued covering 200,000 of the cars included in the new goal.



NEW BRIDGE: Chesapeake Bay Bridge near Annapolis, Md., was officially opened last week. Leading the procession are, left to right, automobiles of Governor McKeldin of Maryland, Governor Carvel of Delaware, and former Governor Lane of Maryland.

It is generally agreed that car-building capacity is now sufficient to produce 12,000 new cars monthly if materials are available and the orders are received. Both have been lacking.

Not Enough—Railroads say they can't get all the cars they need. They place the blame partly on the government, claiming that under controls the carbuilders are not being allocated sufficient materials.

"Because of lower steel allocation levels," says Arthur H. Gass, of Assn. of American Railroads, "new installations in recent months have barely exceeded retirements. . . . It seems doubtful that new freight cars can be built in sufficient numbers in the immediate months ahead to offset necessary retirements."

This is supported by figures compiled jointly by AAR and American Railway Car Institute. They show that slightly less than 45,000 new cars were delivered during first half 1952. At the same time, retirements ranged around 5000 to 6000 monthly.

Reluctant Railroads—But DTA says that this is only one of the two things "defeating" the freight car program. As far as allocations are concerned, DTA will keep trying to get them boosted. The agency points out that the railroads asked for freight rate increases partly on the basis of need for new equipment.

"Apparent reluctance of the railroads to order more cars . . . is a source of present worry," says James K. Knudson, head of DTA. "Order books will be exhausted before the program is completed."

Orders Slip—Source of DTA's complaint apparently lies in the fact that the joint ARCI and AAR reports show that new orders have indeed been slipping. During first half 1952, orders sagged to only a few more than 23,000 units.

As a result, the new car order backlog dropped from 120,000 at the start of the year to less than 100,000 on July 1.

PIPE: Oil Country Goods Tighter

Steel strike cost whole quarter's production . . . Drilling will fall 9000 wells short of goal . . . Quotas for conversion goods only . . . Fuel outlook good—By R. M. Stroupe.

Belt-tightening will be in order for U. S. users of oil-country pipe during the remainder of 1952.

As Petroleum Administration for Defense figures it, an entire quarter of tubular goods production was lost during the prolonged steelworkers' strike. This has been interpreted to mean that the government goal of 50,000 new oil wells this year will be missed by about 9000 units.

Before the strike ended, PAD was notifying operators there would be no allocation of pipe from regular mill production for the fourth quarter. The agency says the notification will stand. PAD expects it will require the rest of the year to get delivery on rollings scheduled for second and third quarter.

Still Some Left—A limited amount, though no one will say just how much, of higher-priced conversion pipe will be available for allocation to operators who state their need for it by Aug. 11. This doesn't guarantee drilling firms anything except "every possible consideration" from PAD, grappling with the distribution problem.

The agency's Production Div. director, Robert L. Foree, has offered one hint of encouragement to operators who have been pushed into a possible loss position by the scarcity of tubular goods. PAD "may be able" to find and allocate limited tonnages of certain sizes of pipe to permit drilling if there is an emergency such as impending lease termination.

Mr. Foree pointed out that PAD doesn't consider it an emergency if an operator merely falls behind on programmed drilling. "Everyone," he said, "is caught in that squeeze."

Outlook for future petroleum

availability in general is not too gloomy, despite the 9000 wells that won't be drilled. PAD viewed the 370 million bbl per day capacity loss as reserve capacity intended to provide a cushion between demand and marketable supply. But in distribution and storage fields the shortage is more than a potential one.

Delay — Official estimates are that there will be a delay of some 75 days in construction of pipelines with an estimated carrying capacity of 1 million bbl of crude and 400,000 bbl of petroleum products per day. PAD also judges the loss in storage capacity expected to be in use next winter will amount to about 11 million bbl of products.

Delayed construction of natural gas plants may cause the loss of

900,000 bbl of natural and bottled gas this year. However, Deputy Petroleum Administrator J. Ed Warren predicted no widespread shortages of natural gas or fuel oil during the winter months. Lack of production supplies and transmitting materials, he said, might cause some "spot shortages."

Next Year—By next year, according to Mr. Warren, full impact of the strike may be felt among refinery builders. Most of the supplies for refinery construction booked for completion in the third and fourth quarter already are on hand, he said.

Future prices of tubular goods are certain to reflect the increase promised steel producers when the recent strike was settled. Indications are that pipe for drilling and allied purposes will undergo price rises higher than average.

This likelihood is giving all producers visions of a situation almost as bad as that of December, 1950. At that time carbon steel went up about \$5 per ton, but oil well pipe and tubing rose \$13 and casing \$8 per ton.

Construction

Mass Production of Prestressed Stringers



Prestressed concrete stringers to support the main deck of New York's new Pier 57 are being mass-produced in what is said to be one of the largest prestressing units in the world. Work is being conducted at Grassy Point near Haverstraw, N. Y., 38 miles up the Hudson River from the pier site. Upon completion of the pier, it will be floated down the river to its site.

The 350 x 12 ft prestressing beds are located near a deep clay pit in which three concrete-box structures of the pier are being fabricated. Steel prestressing wires are stretched the full length of the bed, pulled to a tension of 160,000 psi and then locked in concrete. Prestressing beds make 48 stringers daily.

QUOTAS: Spread New Steel Thinly

Military, atomic energy, machine tools at top of priority list . . . Inventory limit cut to 30 days . . . Nov. 30 is target for third quarter allotments . . . May shift mill schedules.

National Production Authority last week took a series of actions designed to place the distribution plan for steel into operation following resumption of production.

As announced, orders for military, atomic energy, and machine tool programs are to be placed ahead of everything else. In addition, a few "very limited orders" in connection with public welfare programs were to get priority on a par with defense.

NPA Moves—Basic formal actions included the following:

Issuance of Dir. 15 to CMP Reg. 1, which requires rearrangement of mill schedules, if necessary, to assure delivery not later than Nov. 30 of third quarter military, atomic energy, and machine tool program allotments already placed.

Issuance of Dir. 16 to CMP Reg. 1 which authorizes the placing, acceptance and scheduling for delivery through Nov. 30 presently unplaced third quarter allotments.

Amendment of Sec. 3 (a) of CMP Reg. 2 reducing inventory ceilings for steel controlled materials to 30-day levels, beginning Sept. 1 and until the end of the year.

Amendment of Dir. 4 to CMP Reg. 3, giving special preferential status to DO rated orders for A and B products which support the military, atomic energy, and machine tool programs and call for delivery before Dec. 31.

Warehouses — Issuance of Dir. 3 to M-6A, which permits warehouses to reduce individual shipments to one-half the present limits in order to spread steel stocks as widely as possible.

For a 10-day period, beginning July 28, steel items listed in the direction were to be frozen for filling orders for the three preferential programs. Until end of the

Pentagon Steel Needs

New Washington estimates that fix the military bite out of total steel production at as much as 30 pct for the next 6 months are resulting in rejiggered allocation figures that eventually will affect every steel-consuming industry in the U. S.

The 30 pct figure, if approved, would be double the pre-strike allotment. But the Pentagon points out that the 8-week strike "knocked hell" out of its rearmament schedule.

Munitions Board lost little time in exercising its powers to assure the diversion of post-strike steel to military projects. It assigned a special staff of 30 officers to police steel mill operations.

Board also has taken the position that it does not intend to haggle over higher prices. It says it will approve all reasonable "extra payments" applying to extra-shift operations relating to defense steel production.

year, all warehouse receipts of the listed items must be held for preferential orders for 15 days.

Finally, NPA revoked Dir. 12 to CMP Reg. 1, which banned steel shipments from warehouses to manufacturers of consumer goods. It was considered no longer necessary in light of the new actions taken last week.

Industry Controls This Week

Aluminum, Copper—Amends. CMP Reg. 6, M-77, M-100, and revocation, M-74 increase amounts which may be self-certified for building. Amends. M-47A, M-47B allow greater use for decorative purposes.

Government Sales—Rev. 1, GOR 2 contains regulations on sales of a wide variety of products to the U. S., its agents and suppliers.

Machinery—Amend. 35, CPR 30, and Amend. 51, CPR 22 emphasizes the fact that export sales of machinery and general manufactured goods are under coverage of CPR 61.

Machine Tools—Amend. M-41 permits delivery of machine tools to fill unrated orders. Revoc., M-104 removes restrictions on protective finishes applied to machine tools.

Oil Pipe—Amend. 1, M-46 extends deadline for filing applications for priority assistance in purchases of line pipe.

Price Adjustments—Rev. 1, SR 39, GCPR gives regional and district offices of Office of Price Stabilization authority to process applications for ceiling price adjustments.

Reporting Provisions — Amend. 52, CPR 22 establishes simpler price ceiling reporting provisions for manufacturers of water heaters and air conditioning equipment.

Steel—Amend. Sched. 1, M-6A allows warehouses to sell aircraft quality steel for use in certain additional essential military programs. Revoc., Dir. 12, CMP Reg. 1 lifts ban on shipments of steel from warehouses to manufacturers of consumer durable goods. Dir. 6, Rev. CMP Reg. 6 and Dir. 16, CMP Reg. 1 permit placement and acceptance of third and fourth quarter controlled materials orders (including steel) even though the delivery date requested falls after the end of such quarters. Amend. 1, CMP Reg. 2 places a ceiling on users' steel inventories. Dir. 3, M-6A limits distributors' shipments of certain forms and shapes of steel and also increases the quantities of steel required to be shipped by producers to distributors. Dir. 15, CMP Reg. 1 and Dir. 4, CMP Reg. 3 establishes preferential delivery status on controlled material orders placed with steel mills in support of military, atomic energy and machine tool programs. Revoc., Dir. 13, CMP Reg. 1 eliminates special preference status of certain authorized controlled material orders for steel. Revoc. M-42 lifts ceilings set for acceptance of defense orders.

Steel Pricing — Special OPS order permits steel mill producers to make deliveries at prices to be adjusted upward at a later date. Interp. 1, CPR 98 makes it clear that pricing of blanks, punchings of other residue is governed by the regulations of CPR 5 or GCPR. Amend. 10, CPR 5 concerns ceiling prices for scrap dealers in New York.

Steel:

Monthly military steel set-asides spelled out in new DPA order.

A detailed directive issued by Defense Production Administration over the weekend spelled out for steel mills just what percentage of monthly production of each type of steel must be set aside for defense orders.

Reservations range from 2 pct for certain types of rails to 100 for special shell type steel. The order is effective as of Oct. 1.

Object of the directive is to provide the steel industry with the necessary tools for cleaning up outstanding military and defense orders. Reason for the October effective date is that about 60 days will be required to work off most pending orders for other production on which the mills have started.

This means that for the rest of the year the military and defense orders will be getting, on an overall basis, 30 pct of all steel production against about 15 pct before the strike.

Non-defense construction is expected to be affected most by the set-aside order. Construction already started and for which steel is on order is not likely to be delayed much. But it probably means varying degrees of deferment until next January of projects not started.

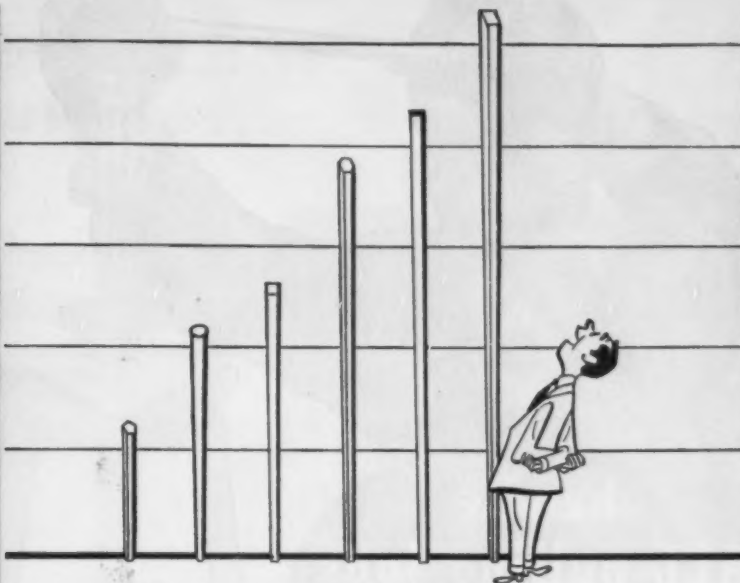
As for most consumer hard goods, officials were not worried. Most manufacturers were in good inventory position at the beginning of the strike, they said.

Actually, the impact of the strike on consumer durables production will not be known for another 60 days—when the confusion clears up with the working off of pre-strike orders.

Oil Pipe Quota Deadline Extended

Deadline for filing applications for priority assistance for purchase of line pipe for small construction and production operations, as well as for MRO in the oil and gas industries, will be advanced from 3 to 4 months prior to

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Controls

the beginning of the quarter in which delivery is required.

Amend. 1 to NPA M-46 sets up the procedures, one for requirements of less than \$5000 and another for more than that amount. Deadline extension is to enable Petroleum Administration for Defense to get out authorizations at an earlier date.

Price Changes on Local Level

Regional and district offices, Office of Price Stabilization, now have authority to process all applications for adjustments in ceiling rates filed by contract motor carriers.

In a procedural action, entitled Rev. 1, Supplementary Reg. 39, General Ceiling Price Reg., OPS took processing of rate adjustment applications involving interstate operations out of the hands of its national office. The revision was effective Aug. 6.

Provided in Rev. 1 is a method by which contract motor carriers operating under temporary authority granted by federal or state regulatory bodies may set ceiling rates. These carriers must file with OPS copies of the schedule of minimum rates and charges which they have recorded with the federal or state regulatory agency.

Rates so filed become legal for 60 days unless there is intervening disapproval by OPS.

OPS Exempts Successor Contracts

Production of coke, coal chemicals, and coke oven gas will be encouraged, government price-setters say, by the exemption from price controls of successor long-term contracts signed by buyers of those items.

Office of Price Stabilization agreed to exempt contracts providing terms as favorable to buyers as original contracts exempted under Supplementary Reg. 13, General Ceiling Price Reg. Under SR 13, no ceiling prices were established on long-term contracts signed prior to Dec. 19, 1950.

Amend. 10, SR 13, effective Aug. 5, authorized exemption of successor contracts.

THE IRON AGE

Small Firm Wage Curbs Extended

Gen. Order 17, issued by Economic Stabilization Agency, authorized continuation of wage and salary controls over nine categories of small businesses employing not more than eight persons each. These include building and construction firms, local and over-the-road truck operators, tool and die or pattern makers, auto repair shops, logging operations and sawmills, and certain firms deriving more than 25 pct of their income from dividends, interest, rents, or royalties.

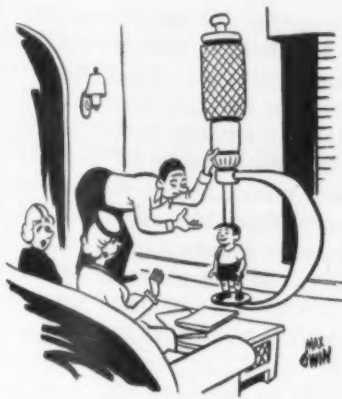
In addition, ESA released Gen. Order 18, consolidating in single National Enforcement Commission of three public members authority to administer tax disallowance enforcement for the wage and salary boards and the Railroad and Airline Wage Board.

Wider Aircraft Steel Use Okayed

Manufacturers of tank-automotive equipment, weapons, electronics and communications equipment, catapults, and landing gear may now buy warehouse aircraft quality steel if it is to be used on military orders.

Previous to last week's amendment of M-6A, warehouse sales of such steel had been largely limited to aircraft plants and to manufacturers of specific types of naval turbines.

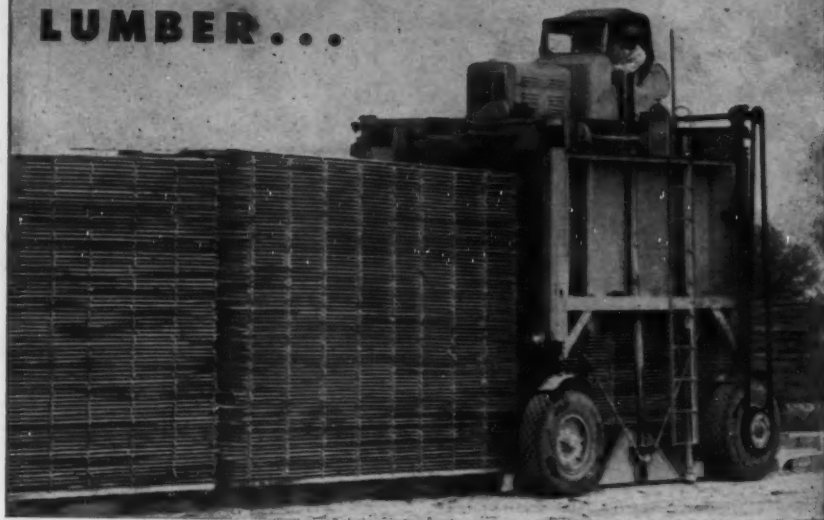
These additional items were permitted at the request of the Army with the approval of the Munitions Board.



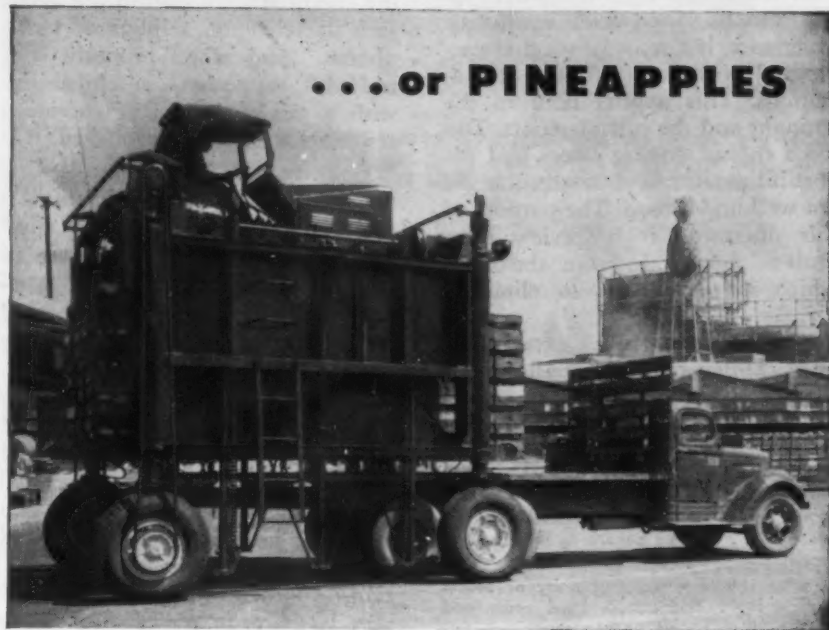
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TECHNICAL TOPICS

MACHINING 18-8 STAINLESS STEEL—METALLURGICAL CONSIDERATIONS

Norman S. Mott

Chief Chemist and Metallurgist

Most of the headaches associated with the machining of stainless alloys can be cured with machining experience, but some of them are associated with metallurgical considerations. This applies both to the wrought and the cast materials. Too often the underlying causes and the possibilities for their correction are not well understood. The purpose of this discussion is to review these causes, and to indicate the steps which may be taken to eliminate them.

The basic difficulties experienced in machining of stainless alloys are:

1. The metal is too hard . . . The cutting tool cannot penetrate or too much tool pressure is required.
2. The metal is too tough . . . It tears away instead of breaking up into chips.
3. Frictional or galling characteristics are excessive . . . Chips adhere to the tool tip, resulting in the balling up of the cut metal.
4. Microstructural non-uniformity or segregation . . . This causes hard spots and results in rough or uneven machined surfaces.
5. The metal work hardens . . . This results in a blunt tool and a polishing rather than a cutting action. Let us review each of these difficulties in turn:

Hardness: Hardness in 18-8 stainless, such as to cause difficult machining, is not an inherent characteristic. It is usually found in the form of work hardening, either from cold rolling or from hot working to too low a temperature. Although machining operations have been conducted up to as high as 350 Brinell, this requires a slow special technique

and for practical purposes such hard metal should be soft annealed by water quenching from 1950-2100°F.

Toughness: Correctly heat treated 18-8 stainless in the condition for maximum corrosion resistance is very tough and ductile. These are desirable characteristics from a mechanical viewpoint, but they are pretty tough on machinability. Experience has shown that machining difficulties can be minimized through the addition of an embrittling agent such as selenium, sulphur or phosphorus. And when properly controlled, maximum machinability with a minimum loss of corrosion resistance can be accomplished.

Galling: Galling tendencies, which are associated with softness and ductility, are also largely eliminated by controlled additions of various alloying elements.

Hard Spots: Hard spots are caused by microstructural segregations such as carbides and other hard phases. The machining tool in passing over these areas does not cut properly and gives a raised and usually a glazed surface, producing a so-called "orange peel" effect. Correct quench annealing heat treatment is required in order to eliminate such a condition. Another cause of hard spots may be burnt-in pieces of molding sand, a condition sometimes found in poor quality castings.

Work Hardening: Work hardening is a universal characteristic of the 18-8 stainless steels. Pressure by the machine tool tends to cold work the surface and make it hard. To offset this, there are a number of machinists' tricks which are somewhat beyond the scope of this discussion. (Further data on the machining techniques can be found in J. J. Roberts' paper, "Don't Fear Threading of Stainless.")

Copies of this article reprinted on heavy stock for convenient filing are available on request.



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Defense Contracts

Navy Will Install Oxygen Plants

Two plants capable of producing oxygen for use in Navy jet planes will be installed aboard the new giant aircraft carrier *Forrestal* and carriers of the *Midway* class to make the vessels more self-sufficient.

Air Products, Inc., Allentown, Pa., manufactures the plants that will go aboard the *Forrestal*. *Midway*-class carriers will get machines developed by Linde Air Products Co., a division of Union Carbide and Carbon.

Capacity of the plants is 4.34 gal of liquid oxygen and 1500 cu ft of gaseous nitrogen per hr. Nitrogen will be used to purge gasoline lines aboard the carriers.

Compressed air, the only necessary raw material, will be supplied either from the carriers' high-pressure air systems or from independent air compressors installed for the purpose.

Expansion Share for Small Firms

Small business has an 11 pct share of dollar volume in the authorized expansion goal for military aircraft production and a 28 pct share in the goal for output of specialized photographic equipment.

Authorized expansion in the military aircraft production field is \$1.33 billion in new facilities and equipment or additions to present plants. Of the amount labeled for small business, about \$49.1 million still is available and is being held open for applications until the end of August.

Goal for expansion in the specialized photo equipment industry is \$8.6 million, with about \$1.9 million still open. Small firms may come in for their share of this remaining amount during August.

A "small business" in the military aircraft field must not have more than 100 employees. Small Defense Plants Administration determined the share to allow earmarking of a definite amount in the fast tax amortization program for small companies. Agency intends to preserve within each industry the pre-Korea ratio between large and small firms.

Large Aircraft Order for Ryan

New orders for airframe parts and aircraft engine components totaling \$7 million were received by Ryan Aeronautical Co., San Diego, during June. The new business resulted in a net gain of \$4 million in backlog orders, pushing the company's total of unfilled defense contracts to more than \$70 million.

Largest order was General Electric's request for aft frames, transition liners and inner combustion chambers for J-47 jet engines. Boeing signed a substantial contract for C-97 fuselage parts, exhaust systems for B-50 bombers and C-97 cargo planes, as well as jet engine tail pipes and external fuel tanks for the B-47 Stratojet. Other major orders were from Continental Motors Corp., Douglas Aircraft Co., Consolidated Vultee and Canadiar and Aeronica companies.

To Build Nuclear Plane Engine

Construction will begin this summer on a \$33 million facility in eastern Idaho, where Atomic Energy Commission will test a prototype aircraft propulsion reactor which could give planes a much greater operational range than they now have.

Aircraft Gas Turbine Dept. of General Electric is handling design, development, and preliminary fabrication of the engine at Lockland, Ohio. Parsons-Macco-Kiewit Co., Los Angeles, under a GE subcontract, has made preliminary design studies for the new facility at the AEC National Reactor Testing Station in Idaho.

Defense Order Ceilings Revoked

National Production Authority last week revoked its order M-42, in effect since March, 1951, which set ceilings for acceptance of defense orders.

Main purpose of the order had been to force a spread of rated orders and prevent overloading a few mills to the extent that regular customers could not be supplied.

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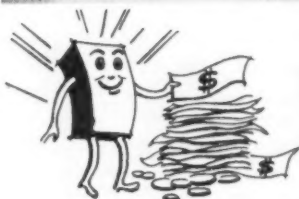
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—Defense Contracts

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Fork assy, 144 ea, \$55,757, Douglas Aircraft Co., Santa Monica, Calif., *N. H. Shappell.*

Curtain, flack, 15153 ea, \$418,374, Stein Bros. Mfg. Co., Chicago.

Accessory kit, 300 ea, \$86,550, Van Brode Milling Co., Clinton, Mass.

Oscilloscope, 60 ea, \$152,500, Lavoie Laboratories, Morganville, N. J.

Signal Generator, 92 ea, \$106,977, Northeastern Engineering, Inc., Manchester, N. H.

Pumps for war aircraft, 487 ea, \$721,360, Thompson Products, Inc., Cleveland.

Harness, 330 ea, \$224,384, Metalcraft Mfg. & Sales Corp., Kansas City.

Accessory kit, 2896 ea, \$63,336, Rubbercraft Corp., of America, Inc., West Haven, Conn.

Aviation armament parts, 196 ea, \$65,302, G. L. Martin Co., Baltimore, P. T. *Russi.*

Repair equipt engines, var, \$2,690,768, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Rifles, 1300, \$45,240,000, Remington Arms Co., Inc., Bridgeport, Conn.

Blast intensity indicator, 5000 ea, John Wood Co., St. Paul.

Extinguisher, 2600 ea, \$74,983, Walter Kidde & Co., Belleville, N. J., *H. B. Kilmaski.*

Extinguisher, 2800 ea, \$82,421, The General Detroit Corp., Detroit.

Valves, gate steel, 497 ea, \$49,037, The Chapman Valve Mfg. Co., Indian Orchard, Mass.

Pin fring, 8000, \$25,840, F. A. Pla Tool & Mfg. Co., Buffalo.

Spindle, 1400, \$82,685, New Albany Machine & Tool Co., New Albany, Pa.

Spindle, 800, New Albany Machine & Tool Co., New Albany, Pa.

Crank, 300, New Albany Machine & Tool Co., New Albany, Pa.

Crank, 5200, New Albany Machine & Tool Co., New Albany, Pa.

Lever, 5500, New Albany Machine & Tool Co., New Albany, Pa.

Internal contour grinders and accessories, 4, \$526,296, Bryant Chucking Grinder Co., San Francisco.

Lathe, turret, 5, \$164,017.50, The Warner & Swasey Co., Cleveland.

Jig borer, jig boring and milling machines, etc., 2, \$72,681.91, The J. H. Elliott Co., Washington.

Drilling machine, 45, \$138,990, Machinery Associates, Inc., Philadelphia.

Gages, tire, 2500, \$49,422.50, Scoville Mfg. Co., Inc., Brooklyn.

Rules, multiple, 191682, \$91,288.33, Master Rule Mfg. Co., Inc., Middletown, N. Y.

Machine, boring, 6, \$213,840.60, The J. H. Elliott Co., Washington.

Precision Surface Grinder, 30, \$113,010, Samuel Machinery Co., Philad.

Lathe, automatic, 48, \$1,524,594, Cone Automatic Machine Co., Inc., Windsor, Vt.

Press, hydraulic, 1, \$52,555, Lake Erie Engineering Corp., Buffalo.

Lathes, 15, \$262,725, W. E. Shipley Machinery Co., Phila.

Drills, portable, 1608, \$43,962.72, Miller Falls Co., Greenfield, Mass.

Presses, 1000 ton capacity, 2, \$172,142.60, Danly Machine Specialties, Inc., Chicago.

Press, tapering, 1, \$72,300, E. W. Bliss Co., Canton, R. Y. *Moss.*

Lathe, engine, complete, 20, \$390,340, The American Tool Works Co., Cincinnati.

Forging Press, 1, \$84,030, Lake Erie Engineering Corp., Buffalo.

Grinding Machine, 1, \$151,179, Bryant Checking Grinder Co., Springfield, Vt.

Press, hydraulic, kell bend type, 2, \$475,200, Clearing Machine Corp., Chicago.

Machines, boring, milling and drilling, 8, \$392,969.20, The J. H. Elliott Co., Washington.

Screw machine, 8, \$142,464, The National Acme Co., Cleveland.

Screw machine, 32, \$959,072, Cone Auto-

matic Machine Co., Inc., Windsor, Vt.
Trucks, fork lift, 164, \$1,037,872, The
Yale & Towne Mfg. Co., Phila.
Turret lathe, 12, \$457,056, American
Steel Foundries, Cincinnati.
Hammers, machinist's, 74185, \$36,537.25,
Fairmount Tool & Forging, Inc., Cleve-
land.
Milling machines, 9, \$207,767.40, Kear-
ney & Trecker Corp., Milwaukee.
Diesel pump, etc., 34, \$23,220, Ameri-
can Bosch Corp., Springfield, Mass.
Jacks, screw, high speed, 80, \$38,-
603.50, The Duff-Norton Mfg. Co., Pitts-
burgh.
Press, hydraulic housing type, 2, \$146,-
728, American Steel Foundries, Cincinnati.
Drills, portable, electric, 2112, \$41,-
479.63, Portable Electric Tools, Inc., Chi-
cago.
Tools, non-sparking, \$196,429.90, The
Beryllium Corp., Reading, Pa.
Milling machines, 45, \$780,750, Kearney
& Trecker Corp., Milwaukee.
Generators, Sharpeners, 39, \$328,630,
Gleason Works, Rochester.

Government Inviting Bids

Latest proposed Federal procure-
ments, listed by item, quantity, in-
vitation No. or proposal and open-
ing date. (Invitations for Bid num-
bers are followed by "B," requests
for proposals or quotations by
"Q.")

Ordnance Tank Automotive Center, Detroit.
Bearing crankshaft main frt, 1300, 53-27, Aug.
12.
Kit repair frt axle steering knuckle flange,
75000, 53-20, Aug. 22.
Kit repair drive shaft universal joint thrust
ball, 12000, 53-20, Aug. 22.
Spring gear shift hand lever, 2000, 53-20,
Aug. 22.

Corps of Engineers, Pittsburgh.

Bracket, stern, 44 ea, Eng 36-058-53-3B, Aug.
15.
Spacer, ponton, reinf, steel, 600 ea, Eng 36-
058-53-2B, Aug. 15.
Traveler, bicycle, 44 ea, Eng 36-058-53-2B,
Aug. 15.
Gunwale, ponton, removable, alum, 1600 ea,
Eng 36-058-53-1B, Aug. 18.
Ramp, raft, alum, steel, 362 ea, Eng-36-058-
53-1B, Aug. 18.
Trestle, alum and steel, 132 ea, Eng-36-058-
53-1B, Aug. 18.
Balk, alum, deck, 9680 ea, Eng-36-058-53-5B,
Aug. 18.
Balk, alum deck short, 484 ea, Eng-36-058-53-
5B, Aug. 18.
Balk, alum deck, tapered, 968 ea, Eng-36-058-
53-5B, Aug. 18.
Ponton, half, alum, 300 ea, Eng-36-058-53-5B,
Aug. 18.
Stiffener, transverse, alum, 75 ea, Eng-36-
058-53-5B, Aug. 18.

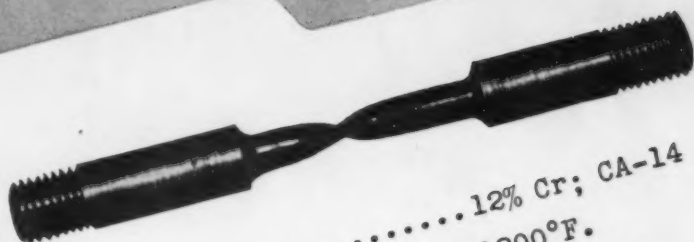


"Salary isn't much but there's plenty of
opportunity for advances."

August 7, 1952

The Story of a Test

DURALOY



Test Rod.....12% Cr; CA-14
Test Temperature.....1200°F.
Tensile Strength.....38,200 psi.
Elongation (2").....29.5%
Reduction in Area.....86.1%

That's high quality metal!
Metal destined for a high alloy
casting which has to meet
some pretty rigid specifications!

The story we want to tell here is about our Testing Facilities. We have
right in our foundry every conceivable testing facility needed when
checking static or centrifugal high alloy castings for industry. Where
required, we make complete chemical, metallurgical, and mechani-
cal checks and tests. And have both a 400,000 volt X-ray unit and
gamma-ray unit, for checking the final casting for hidden flaws.

As we see it, the only way to assure customers of high quality cast-
ings is to have and use all necessary facilities for testing and check-
ing the heat, pour and finished casting.

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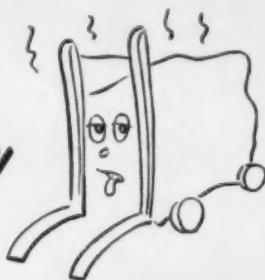
Detroit Office: THE DURALOY COMPANY, 805 New Center Building

Atlanta: J. M. TULL Chicago: F. O. NELSON San Francisco: JOHN D. FENSTERMACHER
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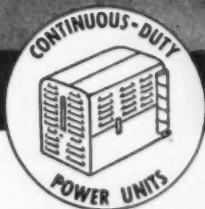
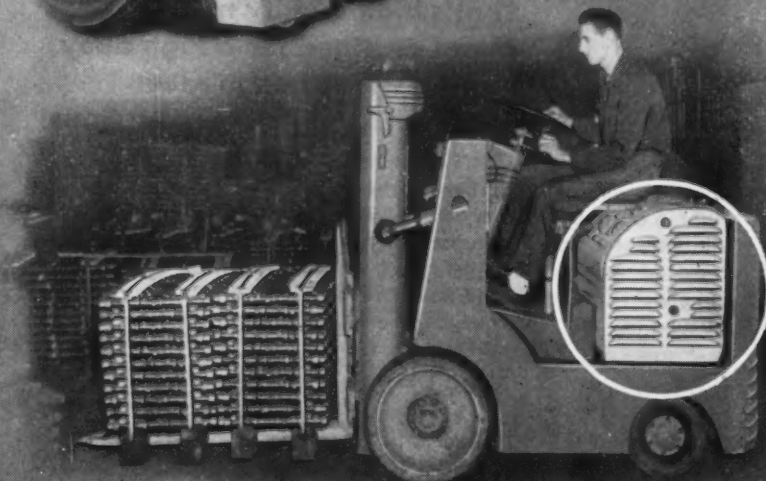
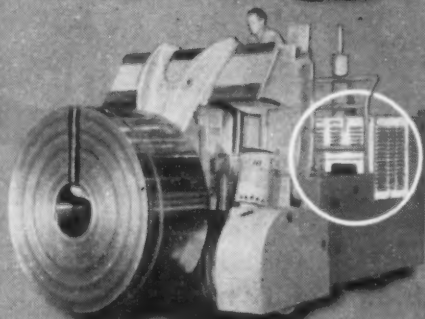
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Letdown?"



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ALL THE TIME!

Only Ready-Power gives your electric trucks full efficiency for every minute of every hour . . . all day long. And because Ready-Power-equipped trucks are so easy to operate, drivers are more efficient, too. Unlimited power plus alert drivers add up to more ton-miles per hour.



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Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

Construction

Steel Inquiries and Awards

Fabricated steel awards this week include the following:

- 4000 Tons, Cookston, Minn., sugar plant, American Crystal Sugar Co. to Paper-Calumenson Co.
- 2600 Tons, Mt. Pine, Ark., Blakely Mt. Dam, U. S. Government, to Chicago Bridge and Iron.
- 1000 Tons, Denver, Academic Hangar USAF, to Capitol Steel Co., Denver.
- 1000 Tons, Denver, GSA warehouse, to Midwest Steel and Iron Works, Denver.
- 875 Tons, Melrose Park, Ill., Ford Parts Building to Joseph T. Ryerson & Sons.
- 590 Tons, Denver, bridge project AF9/2 to Flint Steel Co.
- 575 Tons, Joliet, Ill., cathedral, to Wendnagle Co.
- 542 Tons, Wayne County, Ind., bridge contract \$507, to Allied Structural Steel Co.
- 500 Tons, Denver, GSA warehouse, to Sterling Steel Co., Denver.
- 438 Tons, Carlton County, Minn., bridge 5984 to Illinois Steel Bridge Co.
- 300 Tons, Great Lakes, Ill., Gunners Mate School, to Wendnagle Co.
- 300 Tons, Brighton, Minn., New Brighton, Minn., arsenal warehouse to St. Paul Foundry Co.
- 180 Tons, Silver Belle, Ariz., crusher plant, Stearns Rogers Mfg. Co., to St. Joseph Structural Steel Co.
- 1235 Tons, West Springfield, Mass., bituminous concrete and cement concrete, underpass structure, and reconstruction of dike and alteration of bridge; Riverdale Road along Connecticut River. Cyril B. Raymond, Greenfield, is district engineer, completion date is June 28, 1954.

Fabricated steel inquiries this week include the following:

- 1415 Tons, Broadview, Ill., IBB separation.
- 1365 Tons, Chicago, North Halsted St., Bascule bridge.
- 370 Tons, Chicago, 130th St., separation.
- 295 Tons, Chicago, bldg 7-21 North State St. viaduct.
- 235 Tons, Hillside, Ill., grade separation.
- 185 Tons, Westchester Blvd., grade separation, Cook County, Ill.
- 165 Tons, Hillside, Ill., Mannheim Road separation.
- 110 Tons, Chicago, Van Buren St., Bascule substructure.

Reinforcing bar awards this week include the following:

- 220 Tons, Newbury, West Newbury and Newburyport, Mass., bituminous concrete and five bridges. A. V. Taurasi, Somerville, Mass., low bidder.

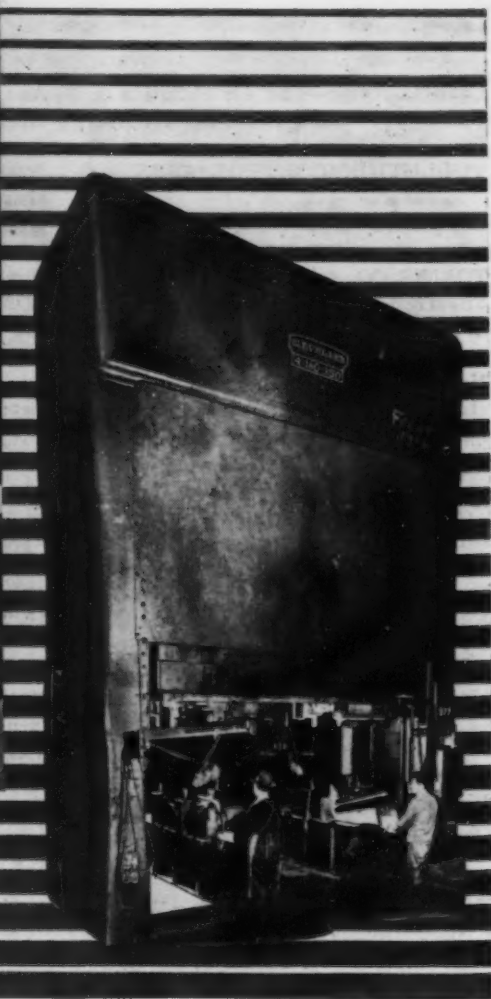
Reinforcing bar inquiries this week include the following:

- 773 Tons, West Springfield, Mass., bituminous concrete and cement concrete, underpass structure and reconstruction of dike and alteration of bridge; Riverdale Road along Connecticut River. Cyril B. Raymond, Greenfield, is district engineer. Completion date is June 28, 1954.

July Construction Hits New High

Delayed action of the steel strike's impact on construction operations was indicated last week when Bureau of Labor Statistics reported a new high for the year in July construction activities.

Advance estimates indicated that the total dollar value put in place during July would pass \$3.1 billion mark to bring the total for 7 months to more than \$18 billion. This was 5 pct more than for the same period last year.



850 TONS of versatile precision...

In the automotive industry where competitive position is measured in parts per hour, this Cleveland Four-Point Press has proven to be a valuable workhorse for a well known automotive manufacturer. Its efficient operation and versatility have resulted in a sizeable upswing of production figures.

The wide 160 inch bed area readily accommodates tandem or progressive dies as well as large single units. Slide control of this press equipped

with a Cleveland Drum Type Friction Clutch is so sensitive and accurate that it is used for delicate precision work or it easily forms large rugged units. Sturdy, cast construction and extra long gibbing assure continuous accuracy.

If you are interested in increased press production, in greater press accuracy . . . *make your next press a Cleveland.* Let us help you with your future production plans.

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Industrial Briefs

Changes Name—The Air Pollution & Smoke Prevention Assn. of America, Inc., has changed its name to AIR POLLUTION CONTROL ASSN.

Completion—New plant in Los Angeles for GENERAL REFRAC-TORIES CO. for the manufacture of unburned basic brick is completed and in full operation.

New Pipe Line — Construction crews started work recently on a new 408-mile, 26-in. natural gas pipe line for TEXAS GAS TRANSMISSION CORP.

Tool Engineering Course — When its fall sessions begin on Sept. 11, Toledo University will be offering a 4-year course in tool engineering. Curriculum, which was developed in cooperation with Toledo Chapter No. 9 of American Society of Tool Engineers, is open to high school graduates.

Nears Completion—The new \$6 million plant of NORTON COMPANY in Worcester is nearly completed and will be in full operation this fall or early winter.

New Plant—Syracuse Smelting Works, Export Div., UNITED AMERICAN METALS CORP., Brooklyn, has completed a new plant in Brescia, Italy. It is designed to manufacture babbitt or bearing alloys and type-metal to serve the European trade.

Elected — Edison L. Wheeler, of Wheeler Protective Apparel, Inc., has been elected president of INDUS-TRIAL SAFETY EQUIPMENT ASSN.

Distributor—Leinart Engineering Co., Knoxville, Tenn., has been named distributor for O-ring seals manufactured by THE PARKER APPLIANCE CO., Cleveland.

Construction Begun — Construction work has begun on a new factory in London, Ontario, for the PLOMB TOOL CO., of Los Angeles.

Distributor Appointed—Squier, Schilling and Skiff, Inc., Newark, N. J., have been appointed distributor for 13 counties in the northern New Jersey trade area, by CARBOLOY DEPT., of General Electric Co.

Assignment—WESTINGHOUSE ELECTRIC CORP. has been assigned the task of developing an atomic power plant "suitable for the propulsion of large naval vessels such as aircraft carriers."

Announce Plan — BORG-WARNER CORP. has announced a plan to move the offices of Norge Heat Div. from Detroit to Kalamazoo, Mich.

Representative—FREEWAY WASH-ER & STAMPING CO., Cleveland, will be represented in eastern Michi-gan by Industrial Products Sales, Inc.

Earnings—CLEVELAND GRAPHITE BRONZE CO. reports a net profit of \$1,786,379 in the first 6 months of 1952.

Income Reported — INTERLAKE IRON CORP. reports consolidated net income for the first half of 1952 at \$1,966,233. In the first half of last year net income was \$2,646,816.

Research Resumed—PHILADELPHIA & READING COAL & IRON CO. has resumed comprehensive scientific research in Mellon Institute, Pittsburgh.



WELDING: Frank Harkins (left), chief welding engineer, Solar Aircraft Co., San Diego, demonstrates a Solar-built butt welder to Francis H. Stevenson, welding engineer, Aerojet Engineering Corp., at a recent meeting of the Aircraft & Rocketry Panel, American Welding Society, at the Solar plant.

New Industry — A new industry for Baltimore, THOMPSON WIRE CO., will begin construction immediately on the 25 acres of land it has just purchased at Sparrows Point, Maryland. Baltimore Assn. of Commerce rates this plant as one of the largest that has come into the area since the New Industry Location Program of the Industrial Bureau was inaugurated 4 years ago.

Expansion—Nine new sales offices and five appointed distributors have been established for the expansion of service to aluminum fabricators of KAL-SER ALUMINUM & CHEMICAL SALES, INC., Oakland, Calif.

Export Corporations—VAPOR HEAT-ING CORP., Chicago, has set up two new export corporations to handle the sale and engineering of steam generators for trains and industry, and the company's train heating system.

New Agent—ALLEN-BRADLEY CO., Milwaukee, has appointed a new commission agent in Florida, Robert P. Smith & Co.

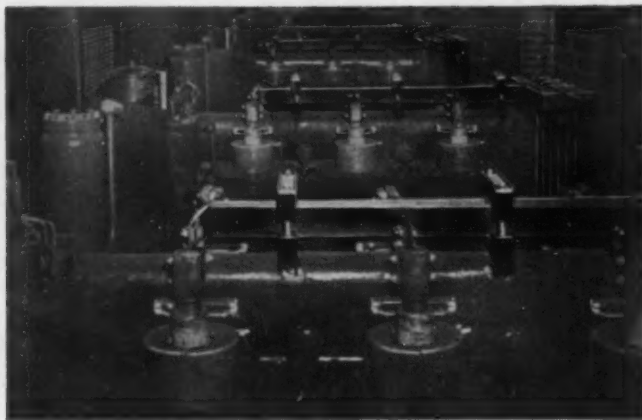
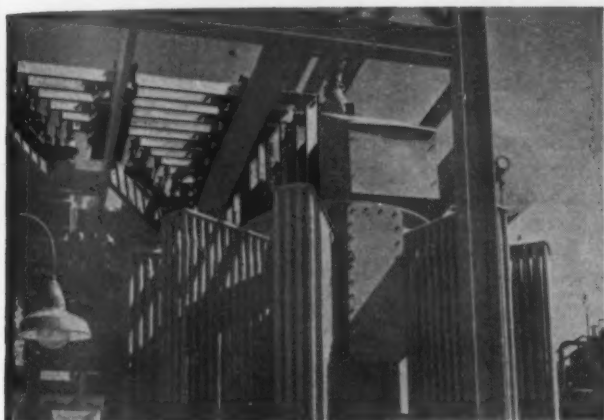
New Examination—BOARD OF U. S. CIVIL SERVICE EXAMINERS announced various exams to fill positions in Naval field establishments in Washington, and vicinity.

Will Build — CARBIDE & CAR-BON CHEMICALS CO., a division of Union Carbide and Carbon Corp., will build a chemical plant in Los Angeles involving an eventual investment of more than \$36 million. Design and engineering work are under-way and certificates of necessity have been issued by the Defense Production Administration.

Additional Space — ALLIS-CHALMERS MFG. CO., Milwaukee, has purchased the plant of Victor Electric Products, Inc., in Cincinnati. This purchase fills a long-felt need for additional space and shipping facilities for Texrope drive equipment.

Department Moved — AIRE-SEARCH MFG. CO., has moved its engineering department to enlarged quarters in a new building, 9225 Aviation Blvd., Los Angeles.

It takes a **Lot** of Copper to make a Lot of Chemicals!



These photographs show a lot of copper bus bar in a new plant of a great chemical company, whose name and location cannot be disclosed. The copper carries heavy currents to electro-chemical equipment for the production of valuable products used in national defense and in industry. Revere furnished 325,000 pounds of bus bar for this service, the bar going into substations, rectifier stations, and cell houses. In addition, at the time of installation the Revere Technical Advisory Service collaborated with the customer in working out some difficult details in the design of switches. If you need electrical conductors, remember that copper has the highest electrical conductivity of all the commercial metals, that Revere makes bus bar, and that the Revere

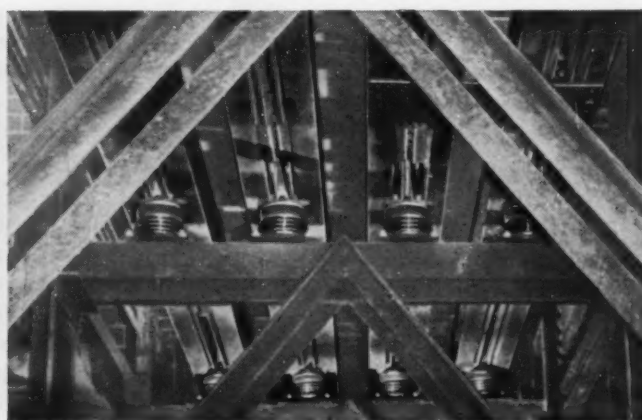
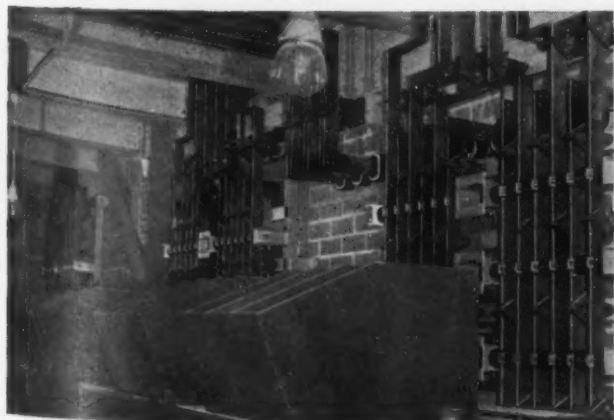
Technical Advisory Service is always ready to work with you on any problem concerning copper and its alloys or aluminum alloys. Call the nearest Revere Sales Office.

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The Automotive Assembly Line

Detroit's Troubles Not Over Yet

**Steel strike settlement doesn't end woes of automakers . . .
See 4 to 6 weeks needed for return to full output . . . Thou-
sands still idle . . . Tubeless tire report—By R. D. Raddant.**

If there were no glad cries from Detroit last week as steel production resumed, it wasn't that auto builders weren't happy that the steel strike had ended. But while steel had emerged from its economic nightmare, Detroit had developed a healthy set of problems of its own.

Automotive builders knew it would be minimum of 3 weeks be-

A state commission calculated that \$14 million was being lost in the state each week that production lines were idle.

Outlook for this week was just as dire. Forecasters believed that this week would see lower production than last, with minimum 4-6 weeks required for a return to normal production.

And even allowing for a resump-

least one car being brought out with the tubeless tire as a standard item.

It is true that a number of manufacturers have been using tubeless tires in their testing grounds. It is possible that a car would come onto the market in '53 if automotive men have their way.

However, it is quite conceivable that tire manufacturers would prefer to drag their feet on mass production of a new tire type for another year at least. There are several reasons for reluctance on their part—first and foremost the cost of getting enough expensive tire molds on the production line.

Lower Price—One large producer of tubeless tires introduced the item on a piecemeal basis. One selling area at a time received the new tire; if you weren't in that selling area, you just plain didn't have a hope of getting that particular model. It is quite probable that a number of other companies would prefer to do something similar in introducing a lower price tubeless tire. That is, let consumer acceptance grow into a proven market and at a normal expansion pace, rather than sinking a large piece of operating capital in new equipment in a single operation.

Patent Problems—The tubeless tire has many advantages, there is no doubt. But there are a number of questions revolving around this tire type, and one of the thorniest is the matter of patents. It is quite possible that tooling for mass production would be accompanied by patent battles over inner linings.

Engineers claim for the tubeless tire better riding qualities and greater blowout protection due to better heat-dissipating properties and static and dynamic balance. In the tire's favor from the automotive producer's standpoint is that it would require no design changes in the wheel.

Even if Lincoln and General Motors are interested, it is still

Turn Page

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS	TOTAL
Aug. 2, 1952	16,825*	5,790*	22,615*
July 26, 1952	34,839	7,665	42,504
Aug. 4, 1951	87,635	29,375	117,010
July 28, 1951	99,844	31,754	131,598

*Estimated

Source: Ward's Reports

fore steel mills reached a high rate of output. And that, however much the reactivated mills produced, nearly a quarter's production was written off the order books as far as autos were concerned.

Meanwhile, 160,000 automotive workers were idle. General Motors had 66,381 waiting working materials in the state of Michigan, had a total of 144,437 idle across the nation. This total amounted to about half the company's hourly-wage employees.

Ford was expecting to open 15 plants with a total of 22,000 employees, but feared another closing of the same plants "shortly."

And Chrysler, with 60,000 idle workers in the Detroit area, was laying off 10,500 at Flint.

The Cost—Total dollar loss last week was estimated at \$1 billion.

tion of normal output, auto builders would be absorbing a \$5.20 increase in the base price of steel, as well as the additional cost of "conversion" steel, which might cost 50 pct more than the common or garden variety.

Checking back over the outlook again: August might be worse than July, production-wise. Sales-wise, factory sales for the first half of '52 were already 1 million units below first half '51. Last week in July and first week in August would see the lowest weekly car production total in the last 6 years.

Tubeless Tires—Talk of tubeless tires as standard equipment within the next year must be evaluated carefully. Announcement of Goodrich's new low price tubeless tire brought with it strengthened reports that 1953 would see at

possible that the tire companies will move cautiously.

Output Hopes—At press time, automotive people were expressing the belief that the industry might hit its original second-half quotas for '52. This despite a production loss of 250,000 cars and trucks thus far. Loss will be considerably higher before these plants attain full production.

Belief remains primarily because it is impossible to tell how much steel the industry will be allowed. It appears that steel will be in short supply for at least the remainder of '52, possibly through the first quarter of '53. It is quite possible that the lag in defense production will be recovered at further cost to the auto industry and other civilian-consumption producers.

Defense purchase ran only 10 to 20 pct of the national economy, and steel mills estimated that prior to the strike only 12 pct of their mill output was directly going into military orders. But the carryover of military demand from the strike period could gum up automotive production plans.

Driving by Disabled Simplified

Plymouth Corp. has developed a simplified driving control for handicapped persons that sounds like the best thus far. A single lever mechanically operates clutch, gas pedal and brake. Device can be installed in 2 hr and removed in 30 min.

Mounting of the unit requires only three clamps along the steering column, two bolts at the foot pedals, and a connection to the accelerator linkage. Accelerator control is operated by turning the lever, as in a motorcycle gas feed. For long drives at a sustained speed, the accelerator is locked in position. In stopping, the brake and clutch can be depressed with a single motion of the hand lever. If engine braking is desired, the clutch can be left engaged while only the brake is depressed.

For the handicapped who drive Plymouths built after 1949, this looks good.

Diamond Conservation Worth Cost

Industrial diamonds are still in short supply. Defense agencies have long urged careful use of diamond cutting tools. Only help that could be suggested for augmenting the supply has been a strict conservation program.

Chrysler Corp. last week totted up the score on its industrial diamond salvage program, found that the care exercised in preserving used diamonds more than offset any cost arising from increased surveillance of diamond use.

Thus far Chrysler found it had salvaged over 8800 carats in industrial crushing bort and small diamonds. Chrysler estimates the cost of bort at \$5000 per lb. What seemed more graphic—in a period of shortage Chrysler has been salvaging enough diamond material to meet 11 pct of its total requirements—and sells the salvaged material to the suppliers who make up Chrysler's cutting wheels and cutting tools.

A variety of methods are used

in collecting diamond material. Swarf is recovered at the cutting machine by attachments that suck the dust into collecting bags. Wet grinding sludge is saved in settling tanks which prevent runoff of the diamond particles into plant disposal systems.

Chemical treatment is required to clean the diamonds, and to free them from binders used in cutting wheels.

Chrysler Moves Engine Facilities

Chrysler last week completed a mass move of 394 machines and machine tools, engine assembly conveyers and plant engineering equipment last week, as it transferred its marine and industrial engine facilities from the Jefferson Ave. plant in Detroit to the new engine plant at Trenton, Mich.

The new plant will produce seven marine engine models ranging from 87 to 165 hp. It will also make the nine basic industrial engines in the Chrysler line.

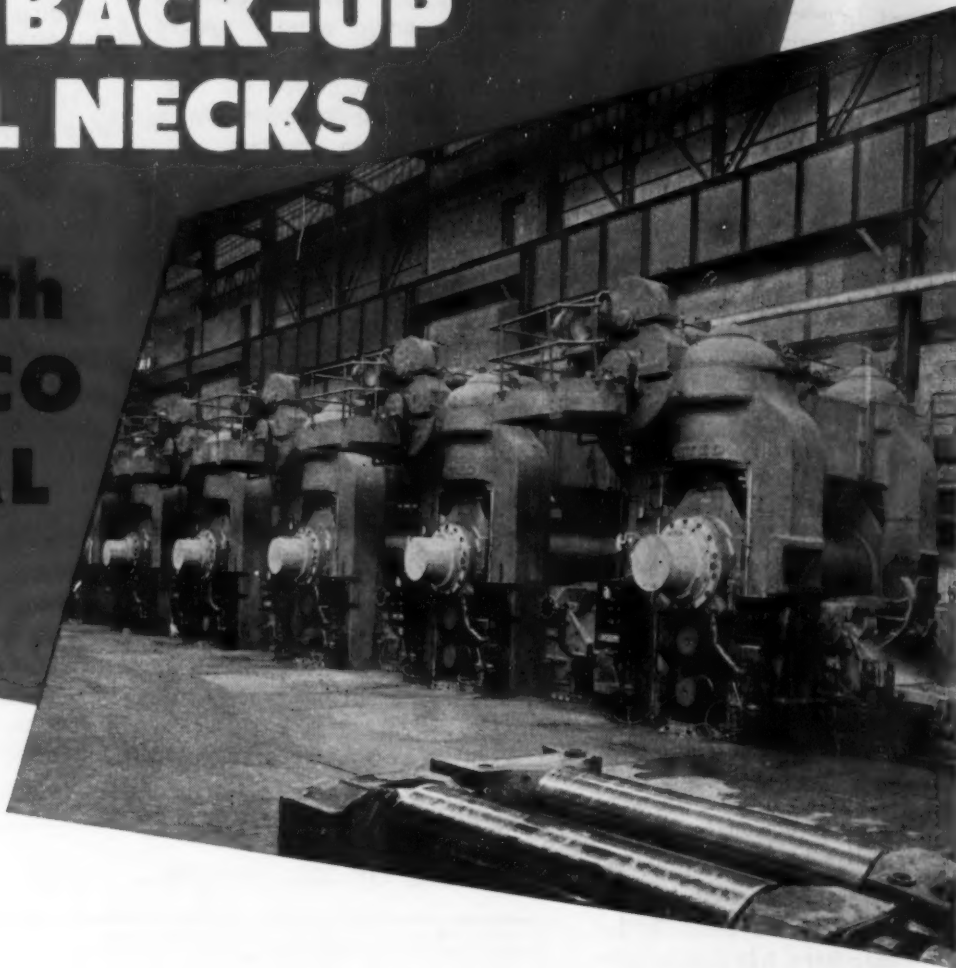
THE BULL OF THE WOODS

By J. R. Williams



BETTER PROTECTION FOR BACK-UP ROLL NECKS

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**TEXACO
REGAL
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YOU CAN give the oil film bearings of your back-up rolls better protection against friction, heavy loads and high temperatures by using *Texaco Regal Oil*. This heavy-duty, turbine quality oil keeps the circulating system clean. Bearings thus get constant lubrication. You get longer bearing life and lower maintenance costs.

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This Week in Washington

New WSB to Travel Middle Road

Doesn't want "pro-labor" or "pro-management" label . . . Will have much work to accomplish in wake of old board . . . Labor terms new restrictions "weaknesses"—By G. H. Baker.

Federal wage controls, from here on, are to be administered without noticeable bias toward either labor or management. New wage board, anxious to avoid the mistakes of its predecessor, will lean over backward to avoid being branded as either "pro-labor" or "pro-management."

Business might as well face it: There'll be many Washington-approved wage increases in the months ahead. Some of the new Wage Stabilization Board members feel that their work-load will be much heavier than that handled by Nathan Feinsinger, former WSB chief, and his associates. (Old board acted in 60,000 cases, recommended settlement in 22 actual disputes.) Recent pay and benefit increases awarded steel and aluminum workers are expected to result in applications from literally every affected industry during the remainder of this year.

Powers Cut — Increases, where granted, will tend to follow the steel and aluminum wage patterns. The so-called "modified union shop" is to be recommended for most open-shop firms and industries. But the union shop and other controversial non-wage subjects are now strictly out of bounds. Congress, annoyed and angered at unjustified dabbling in the union shop issue, went out of its way in writing the new control law to confine the new WSB's authority strictly to wage matters, and to remove the previous authority to recommend settlements.

Malarkey — Labor's threat to "take a walk," to boycott the new WSB, now may be dismissed as just so much window-dressing.

Where else could labor go, in Washington, to pressure for higher wages?

Top officials of the CIO and AFL felt they had a moral obligation to their memberships to protest certain features of the new board, but never really intended to reject the opportunity to share in wage-adjusting activities at the Capital. Their boycott of the old WSB 18 months ago got them nowhere, but after they agreed to participate, they got nearly everything they asked for.

While the new board will strive to establish a reputation for complete fairness by showing a tougher attitude toward union demands, it certainly has no intention of tipping the scales in favor of manage-

ment. Its immediate task is to regain favor with Congress.

Objections — Labor's grudge against the new WSB arises mainly from these three limitations (labor chiefs call them "weaknesses") written into the new control law by Congress:

1. Inability of the new board to recommend settlement of disputes.

2. Control of the board by the Economic Stabilization Agency. (Labor says this limits the board to only "advisory" functions.)

3. Necessity for Senate confirmation of all WSB members. (This could mean long delays, or even stop-orders, on some of the White House nominations. Current members are enjoying "recess appointments" until Congress reconvenes.)

From every angle, WSB seems earmarked to emerge as one of Washington's most important—and certainly one of the busiest—defense agencies in the next 6 months of federal regulation.

Recommend and Advise — New WSB powers, as described in Economic Stabilization Agency General Order 16 include the authority to:

1. Formulate and recommend to the head of ESA general policies and regulations concerned with stabilization of wages, salaries, and other compensation.

2. Advise, upon request, as to interpretation or use in particular circumstances of policies and regulations issued by the Economic Stabilizer, when such orders relate to compensation matters.

All records of the old wage board were ordered turned over to the new panel. Interpretations, rulings, decisions, and other actions previously taken by WSB will remain in effect except those inconsistent with the new order or "with the Defense Production Act of 1950, as amended or hereafter amended, revoked or terminated under proper authority."

Titanium Contract Signed

Defense Materials Procurement Agency has entered into an agreement under which E. I. du Pont de Nemours & Co. will triple its titanium output.

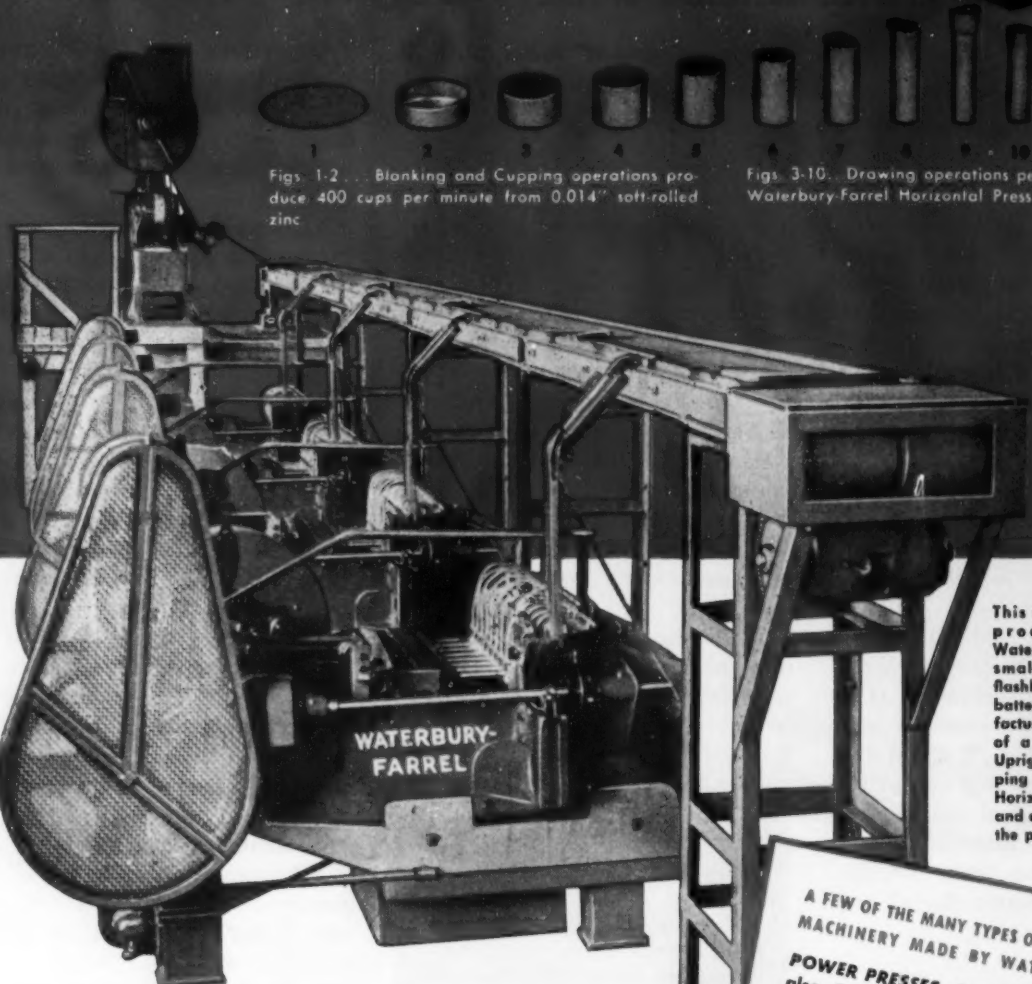
This is the second such agreement written by DMPA. First was with Titanium Metals Corp. of America, which calls for production of 18,000 tons of the metal over a 5-year period. Du Pont will produce an extra 13,500 tons during the same period.

Under the Du Pont agreement, the government will advance \$14,700,000 for expansion of titanium facilities at Newport and Edgemoor, Del. A tax certificate of necessity is pending.

A clause in the agreement protects Du Pont against loss should production methods, still in the development stage, be developed which are less costly than those which are now used to produce sponge at \$5 per lb.

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Figs. 3-10 . . . Drawing operations performed by each Waterbury-Farrel Horizontal Press.

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IRON ORE: Picture Not So Bleak

Probable shipping loss totals 21 million tons . . . Furnaces out for 2 months cut demand . . . More, heavier loads will be shipped . . . Pool 6000 railroad cars—By A. K. Rannels.

Steps are being taken to avert the threat of an ore shortage during the coming months. But the outlook is not as dark as once feared, depending partly on whether there is an early winter.

Defense Transport Administration is counting heavily on an all-rail shipping program which it has sponsored for getting a lot of iron ore out of the Great Lakes territory before the season closes.

It is estimated unofficially that something like 21 million tons of Lake ore shipping have been lost over recent weeks.

Lake ore shipments were down about 10.5 million tons from what they should have been as of July 1. Two weeks later the loss was estimated to have risen to 16 million tons. Incomplete figures indicated a probable loss of another 5 million by the end of the strike.

Brighter Side—There are three primary reasons why this loss of shipping may not be as serious as it looks. One, of course, is that for a period of 2 months most furnaces which use Great Lakes ores were down. This means a lessened demand and that previously estimated requirements will be revised downward considerably.

Another reason is the fact that more water carriers carrying heavier loads will be in service for the remainder of the season.

Still a third factor is the emphasis which will be put on the projected all-rail movement of ore from the head of the Lakes. DTA Administrator James K. Knudson is highly optimistic as to the end result.

6000 Cars—As set up in cooperation with the railroads and steel industry, the DTA-sponsored program is for the roads to pool a total of 6000 open tops for this

purpose. This is estimated to be sufficient to move out 450 carloads daily.

Mr. Knudson hopes that an overall total of 4 million tons can thus be moved out by rail. That this is not overly optimistic is supported by the United States Steel Corp. estimate that it alone expects to receive about one half this amount by rail.

The Knudson estimate would represent nearly 25 pct of the estimated total shipping loss. It would



OMINOUS: Empty iron ore stockpiling yard at a Republic Steel Corp. plant in Cleveland underscores threat of a shortage this winter.

also be nearly triple the amount normally moved in this fashion prior to 1949.

All-rail ore movement is relatively new. Prior to 1950 it seldom totaled more than 1.5 million tons. But such shipping was stepped up in 1950 and last year about 7.9 million tons represented all-rail movement.

Rail Losses Unknown—No sound figures are available to indicate rail shipping losses. But DTA figures do show that at the start of the strike, rail deliveries were running behind last year's rate by 1.5 million tons.

During the stoppage, Interstate Commerce Commission issued service orders to the railroads under which ore was loaded and held, free of demurrage, at points near the mills ready for unloading once the strike ended.

DTA is hopeful that winter will be late this year. And plans are being worked out to have the Coast Guard help in keeping the Lakes open a few days longer than usual this year, and also to free the ore carriers from any sudden, early freezes.

Other plans for maintaining shipping as long as possible include additional thawing facilities so that loading of ore, either by boat or rail, may continue for a while longer when freezing weather does arrive.

BLS Reports June Strike Losses

June strikes cost the nation more in wages and production than for any month since October, 1949, Bureau of Labor Statistics finds. But the total new stoppages in June were fewer than in May.

The steel strike was the culprit, since it accounted for 80 pct of the total. Total man-days lost through strikes amounted to 14 million—not including idleness caused indirectly by strikes.

This means that three out of every 200 workers were on strike. It means also that the steel strike accounted for 11 million days lost.

CHEMICAL USERS' GUIDE To General Chemical Products for the Metal Industries

PRODUCT	AVAILABLE FORMS	COMMERCIAL STRENGTHS	SHIPPING CONTAINERS	APPLICATIONS
Sulfuric Acid H_2SO_4	Liquid	66° Be (93.19%) 99% Oleum, 20-65%	Carboys (except Oleum) Steel Drums Tank Trucks Tank Transports Tank Cars	Pickling and descaling; electroplating; bright dipping; electrolytic polishing; galvanizing; anodizing.
Hydrochloric Acid HCl + water (Muriatic Acid)	Liquid	18° Be (27.92%) 20° Be (31.45%) 22° Be (35.21%)	Carboys Tank Trucks Tank Cars	Pickling; electroplating; bright dipping; galvanizing; tinning; etching metals; dissolving metals.
Nitric Acid HNO_3 + water	Liquid	36° Be (52.30%) 38° Be (56.52%) 40° Be (61.38%) 42° Be (67.18%) 95%	Carboys (except 95%) Drums Tank Cars	Pickling; electroplating; bright dipping; oxide finishing; dissolving and stripping metals.
Hydrofluoric Acid HF + water	Liquid	60% 70%	Steel Drums & Tank Cars	Pickling; electroplating; electrolytic polishing; bright dipping.
Sodium Fluoride NaF	White Powder	95% or 97% Light or Dense	Multiwall Paper Bags Fibre Drums	Manufacture of rimmed steel; heat treating; galvanizing; pickling; electroplating.
Sodium Bifluoride $NaHF_2$	White Powder	95% or 97% $NaF \cdot HF$	Fibre Drums	Electroplating.
Trisodium Phosphate $Na_3PO_4 \cdot 12H_2O$ (TSP)	Crystal	P_2O_5 —18.4%	Multiwall Paper Bags Fibre Drums	Alkali cleaning.
Sodium Metasilicate $Na_2SiO_3 \cdot 5H_2O$	White Granules	98.5%	Multiwall Paper Bags Fibre Drums	Alkali cleaning.
Oxalic Acid $C_2H_2O_4 \cdot 2H_2O$	Colorless Crystals	99.5%	Multiwall Paper Bags Fibre Drums	Oxide finishing; metal cleaning.
Potassium Fluoborate KBF_4	White Powder	97.0%	Fibre Drums	Aluminum and magnesium casting; as a flux and grain refiner for aluminum; for removing magnesium from secondary aluminum alloys.
Sodium Fluoborate $NaBF_4$	White Powder	94.0%	Fibre Drums	
Ammonium Fluoborate NH_4BF_4	White Powder	96.0%	Fibre Drums	Aluminum and magnesium casting; electroplating.
Fluoboric Acid HBF_4 + water	Liquid	42.0%	Rubber Drums	Electroplating; metal cleaning or dipping; electropolishing.
Lead Fluoborate $Pb(BF_4)_2$ + water	Liquid	51.0%	Carboys	Electroplating.
Tin Fluoborate $Sn(BF_4)_2$ + water	Liquid	47.0%	Carboys	Electroplating.
Copper Fluoborate $Cu(BF_4)_2$ + water	Liquid	45.0%	Carboys	Electroplating.
Iron Fluoborate $Fe(BF_4)_2$ + water	Liquid	45.0%	Carboys	Electroplating.
Nickel Fluoborate $Ni(BF_4)_2$ + water	Liquid	42%	Carboys	Electroplating.

The products advertised are commercial chemicals having various uses, some of which may be covered by patents, and the user must accept full responsibility for compliance therewith.



OTHER PRODUCTS: Acetic Acid; Ammonium Thiosulfate Solution; Aqua Ammonia; Barium Fluoride; Chromium Fluoride; Copper Fluoride; Copper Sulfate; Glauber's Salt; Iron Sulfide; Nickel Fluoride; Perchloric Acid; Sodium Bisulfite, Anhydrous; Sodium Silicate; Sodium Sulfite, Anhydrous; Stannous Chloride; Tetrasodium Pyrophosphate; Phosphoric Acid; Sodium Tripolyphosphate.

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West Coast Report

Canners Get Off Tinplate Hook

Rush shipments from eastern mills save crops from rotting . . . Local producers work feverishly . . . Layoffs continue at assembly plants . . . Yolo plans new mill—By T. M. Rohan.

The vast industrial resources of the East came to the rescue of the western farmer last week.

From the steel mills of Pittsburgh came the first eight of a scheduled 20 or more cars of liberated tinplate to save western fruit from rotting on the ground. From Kaiser's new Fontana mill 412 tons came in the nick of time. Defense Production Administration officials also revealed an Air Force airlift had been considered.

High speed freight hastily assembled from strike-idled cars and operating most of the way behind the Southern Pacific's Overland Limited made it with 240 tons from Pittsburgh to the Roseville, Calif., yards in the record time of 66 hr. There it was funneled out to can factories at Sacramento, Stockton, Oakland, San Jose, Los Angeles and north to Oregon and Washington. Trains from Wier-ton, Irvin and other eastern centers were due to arrive for the California canning season which reaches its height in the third and fourth week of August. Can manufacturers picked up the special shipping tab—four times the normal rate.

Local Tinplate—Kaiser worked around the clock on final testing of its new \$20 million tinplate mill at Fontana, Calif. At week's end it was able to ship 412 tons 2 months ahead of schedule to meet

the crisis. Complete tonnage, enough for 3 million No. 2½ size cans, came off the hot dip line. Electrolytic lines are scheduled to start in September.

U. S. Steel nationally had 35,000 tons of tinplate on hand. Local supplies produced at Pittsburg, Calif., were shipped by truck and train in record time to waiting can manufacturers.

From Hawaii—American Can Co. is also rushing in tinplate by the steamship *Alaskan* which will sail from Honolulu Aug. 10 or 11 and arrive in California Aug. 15 or 16.

Tinplate will be "pirated" from the company's Hawaiian plants which have large stocks. Supplies will be replenished within 60 days in plenty time to meet the needs of Hawaiian canners. This emergency shipment, sufficient for 1000 carloads of cans, will set American Can Co. back \$100,000.

Canners were ready to turn out the brass band. The greatly relieved Canners League of California announced as a result of the fast shipments "no loss whatsoever is anticipated." In Washington and Oregon losses were expected to be small—probably no more than 10 pct. Closing of one cannery in Modesto, Calif., for lack of cans galvanized the industry to action and the plant was able to reopen a day later.

Still Short—Automobile assembly plants on the tail end of the Detroit supply line generally didn't expect to get back in full production for several weeks. GM with about 3700 workers in five plants was doing some maintenance work and preparation.

Dodge at San Leandro, Calif., which had struggled along with 245 truck assembly workers, finally had to lay them off. Recall to work for these and 557 auto workers is scheduled for Aug. 25. Ford at Richmond, Calif., has kept 50 men busy on metal finishing of welded panels, a critical item, and doesn't expect to resume full production until Aug. 18.

Yolo Certificate—The ambitious Yolo Steel and Metal Co. of West Sacramento, Calif., last week revealed it has a few more plans up its sleeve.

Originally, Yolo planned an integrated mill but was turned down by DPA. It was later granted a \$44 million tax certificate for a blast furnace to be built in Sacramento. Last week DPA announced Yolo had now been given a 55 pct certificate for \$81,250,000 for accelerated write-off on a steel mill in addition to the blast furnace. A company spokesman said Yolo plans a mill with 375,000 net tons annual capacity. It would turn out pipe, cold-rolled plate, hot-rolled plate, forgings, slabs, bar stock and tool steel. Additional plans also call for 100,000 tons of tinplate. Openhearth furnaces would be used. Total employment would be about 2000. No information was available, however, on sizes of equipment or range of products anticipated.

AIR BRAKE: Boeing's 8-jet YB-52 bomber, soon to be made in Seattle, uses a parachute to shorten landing run.

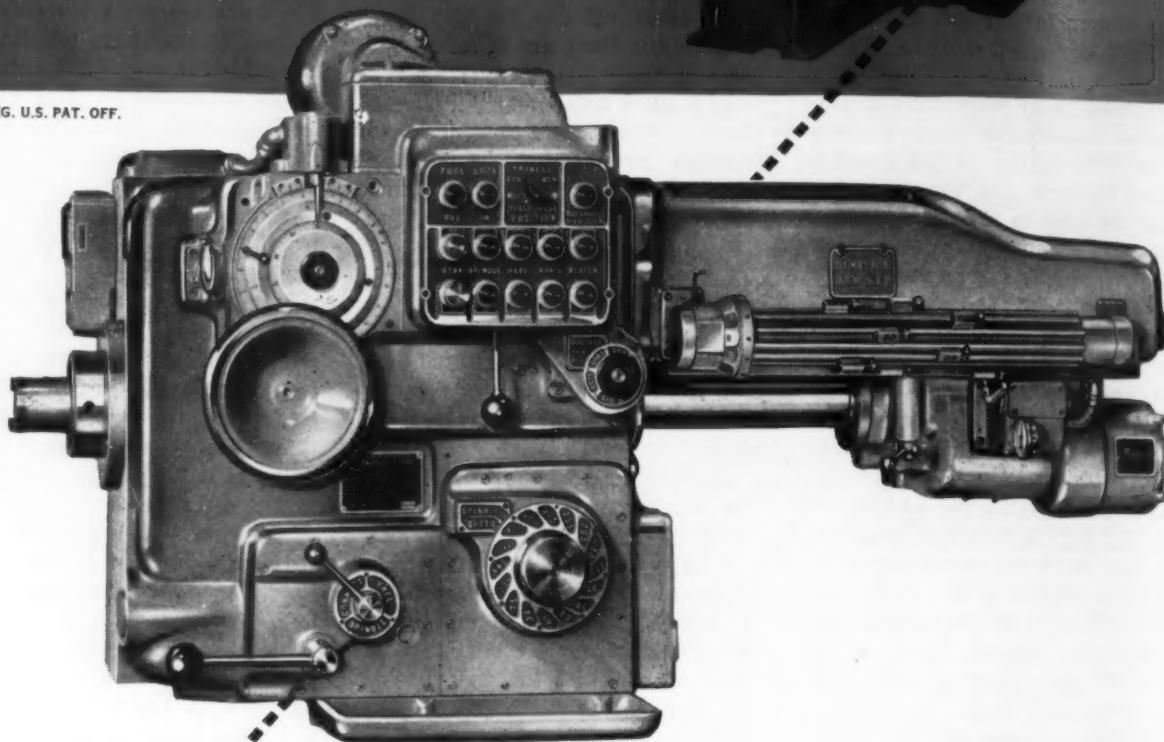


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Steel Consumers Breathing Easier

Settlement of U. S. steel strike averts Canadian shutdown . . . But steel need is urgent . . . Expansion of blast furnace capacity boosts demand for U. S. iron ore.—By F. Sanderson.

With the U. S. steel strike ended and a strike shutdown of the Canadian steel industry bypassed, steel users in this country have shed many of their worries regarding future operations.

Main problem now is the length of time it will take U. S. to get back to a production stage where it can again send a steady flow of urgently needed steel to Canada. If there is any long delay industry here may be affected. Up to the present this country has been fortunate in having enough materials on hand to carry through the strike-period so there have been no serious cutbacks in industry.

Ore Shipments—Another question of vital importance to primary steel producers in the Hamilton area is how long will it take to get deliveries of iron ore from the States. Imports of U. S. iron ore were only a fraction of requirements in the strike period. Result was that consumers had to eat into stockpiles to maintain production schedules.

If ore shipments are sufficient to enable mills to build stockpiles to meet the expanded capacity of the blast furnaces scheduled for operation in the fall, production problems will be overcome. If not, there may be trouble.

Settlement—A wage agreement has been reached between Steel Co. of Canada Ltd., Hamilton, and the CIO Steel Workers, which will have to be ratified by the union members over the weekend. Terms of the agreement are secret, but are expected to provide the following:

A wage increase of 7½¢ per hr,

to match the U. S. base rate of \$1.435; partial acceptance by Stelco of the job evaluation scheme giving additional increases based on skill and responsibility. This would indicate an average hourly rate including all extras and fringe benefits of \$1.86 or better.

While Steel Co. of Canada was first to reach an agreement with the union, it is generally believed that both Algoma Steel Corp., Sault Ste. Marie, and Dominion Steel & Coal Co., Sydney, will immediately fall in line.

Prices Up—It is apparent that the wage problem has been settled, but now there is the question of what the steel industry will do in the way of price increases to offset higher labor costs. There are two schools of thought here. One believes producers may absorb the additional cost without jumping steel prices. The other holds that Canadian steel is likely to be increased \$3 a ton.



Advances in U. S. steel prices mean that Canadian industry depending largely on American steel and components will have to pay more for their raw materials. But part of this increased cost will be eliminated because the Canadian dollar holds around a 3½ pct premium over its U. S. counterpart.

Tool Boom—Announcement that the U. S. has eased regulations on machine tools, permitting toolmakers to take orders without a defense priority rating is expected to boom tool imports by Canadian plants. Also it will break the machine tool bottleneck for Canadian defense plants.

Canadian machine tool builders report a tapering off in new orders but are optimistic regarding the future of this industry. The majority do not look for any sharp cut in sales for another year or two and Canada's industrial expansion boom may be prolonged for years.

In the first 4 months this year, Canada's machine tool imports totaled \$16.1 million, of which \$12.4 million were from the U. S. and \$2.4 million from the United Kingdom. Value of American tools imported was \$2.3 million above the corresponding period in 1951. Imports from the United Kingdom rose \$1 million.

Radium—Marketing of radioisotopes produced at the Chalk River plant which has been handled in the past 2 years by Eldorado Mining & Refining Ltd., has been switched to Atomic Energy of Canada, Ltd., Ottawa, as of Aug. 1.

Eldorado Mining & Refining will continue to produce radium as a by-product of its uranium operation, but withdraws from the marketing of radium products. However, the transfer does not interfere with the marketing of uranium, which will continue to be the responsibility of Eldorado Mining & Refining.

Machine Tool High Spots

Decline in Defense Orders Expected

NMTBA spokesman sees defense business fading in the next 2 years . . . Civilian orders will be more important . . . Increase in new orders in June not a trend—By G. Elwers.

Machine tool builders can expect heavy defense business for another 2 years, at least. But the ratio of defense work to civilian work will be declining steadily during that time.

That is the way the future looks to the National Machine Tool Builders' Assn., as outlined by its president, F. S. Blackall, Jr., at the recent Machine Tool Sales Conference at Cornell University.

Three Factors—Speaking to 140 students at the conference sponsored by the NMTBA and American Machine Tool Distributors' Assn., Mr. Blackall said the future will be affected by three elements: The defense situation, the political situation, and the basic business cycle.

Defense needs are of course almost impossible to predict, but Mr. Blackall said as it looks as though defense will be a large part of machine tool business for at least 2 more years. And it will be an important source for machine tool business for many years after that. However, he indicated defense orders during the next 2 years will decline and civilian orders will become more important in keeping up machine tool production.

Not Good—Though the industry rides high on defense orders now, he stated, defense business is not entirely good business. It is too variable. Sometimes the machine tool industry has to cram a decade of production into 3 or 4 years. And then defense orders slump below the level needed to keep the industry going strong.

Indications are, however, that defense orders will not drop off as much as they have in the past.

Cloudy Future—The economic future is cloudy no matter which political party wins the coming elections, Mr. Blackall said. A Democratic victory would mean continuation of present unsatisfactory economic policies. A Republican victory might mean a painful period of adjustment while we get back on the right economic track.

Basic business cycle for the machine tool industry has historically been one of violent changes. Mr. Blackall pointed out to the students that the break-even point of the industry is now higher than it has ever been. This makes it more important than ever that machine tool salesmen work to prevent a bad slump. The way to do this is to stress effective modernization and replacement policies to customers, Mr. Blackall said.

Tool Show—It is probable that the next National Machine Tool Builders' Assn. machine tool ex-

position will be held in 1955. This date has been at least tentatively and perhaps definitely set. A committee is now looking for a suitable site.

A good location is not as easy to find as for other equipment shows. A machine tool exhibit requires something extra in the way of space, floor load capacity, electric power availability, and railroad sidings.

The last machine tool show was held at the World War II Dodge aircraft engine plant in Chicago which was only partially occupied by Preston Tucker's ill-fated automobile firm. Now the plant is fully occupied by Ford, so it is not available.

Still Slipping—Most machine tool industry sales executives agree that the sharp upswing in orders during June did not represent a reversal of the steady business decline which has been going on for some months.

The increase seems to have been primarily due to end-of-fiscal-year buying by government departments. The Navy Bureau of Ordnance and Bureau of Ships, particularly, were heavy buyers during June.

No Shortage—Note on cancellation of the Fisher Body contract to build Bullard vertical turret lathes:

Fisher was to build 42-in. Cut-Masters. In the current M-41 revision, 42-in. Cut-Masters are not included on the list of critical machines which cannot be shipped to civilian customers.

Productivity—Bureau of Labor Statistics reports worker time per unit in production of machine tools dipped 3 pct from 1949 to 1950. (See p. 69 for detailed story.) Average age of machinery, according to 32 reports submitted to BLS, was 12.7 years in 1949 and 12.9 years in 1950. Poor business in 1949 held down expenditures of machine tool companies.



The Iron Age

SALUTES

Charles F. Colbert, Jr.

His firm is one of the largest ferroalloy producers in the business, thanks to his hard work.



WHEN Charlie Colbert took over as president of Pittsburgh Metallurgical Co. in 1939, he found himself heading an organization that had not made too much progress in the 26 years of its existence.

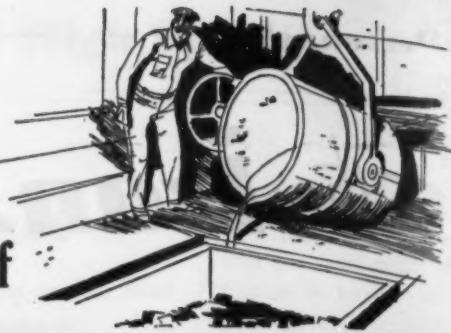
Pitt-Met then consisted of one small plant at Niagara Falls. Today the company is one of the largest ferroalloy producers in the business. It has three large plants—at Niagara Falls, Calvert City, Ky., and Charleston, S. C., and district sales offices in seven cities. Last year sales amounted to better than \$20 million. Its customers include virtually all the large steel producers.

Charlie Colbert gets most of the credit for Pitt-Met's rapid growth. He has shouldered more than his rightful share of the burden and gathered about him a get-up-and-go organization that is hard put to keep up with him. Nobody ever accused Charlie of having a shiny seat in his pants, and nobody who works for him enjoys the luxury, either.

Charlie lives near the company's main plant at Niagara Falls, can get to the office in 15 minutes. But he's just as likely to turn up at either of the other two plants, a district sales office, or hit the road to call on a customer.

He gets such a kick out of his job that work itself is a form of relaxation. But when he really wants to get away from it all, he likes nothing better than to take off on a yachting or fishing trip.

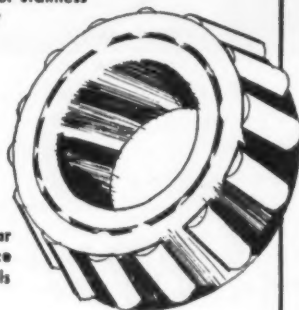
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Alloy	Cr	Si	C	Application
Low Carbon Ferro Chromium	67/72%	1.00% max.	.03/2.00% max.	For production of stainless & other low carbon chromium steels as final chromium addition.
Low Carbon Ferro Chromium	58/60%	6.00/11.00%	.03-.06-10% max.	For large chromium additions to stainless where rate of solution and moderate silicon addition are desirable to aid chromium recovery from slag.
Low Carbon Ferro Chromium Silicon	38/42%	40/45%	.03&.05% max.	Serves dual purpose of adding chromium to stainless steel and recovering oxidized chromium from slag.
Medium Carbon Ferro Chromium Silicon	48/52%	25/30%	1.25 max.	For adding both chromium and silicon to low alloy steels; ease of solution permits ladle or furnace additions.
High Carbon Ferro Chromium	66/70%	2.00% max.	4/6%	Standard alloy for moderate chromium additions to medium and high carbon steels and irons.
Iron Foundry Ferro Chromium	62/66%	6/9%	4/6%	A more readily soluble alloy for moderate chromium additions to cast iron.
Ferro Chromium Briquettes	Hexagonal. Weigh approx., 3 3/4 lb. contain 2 lb. of chromium			Practical and convenient form of adding ferro chrome to cupola.
V-5 Foundry Alloy	38/42%	17/19%	8/11% Mn	A high carbon alloy for chromium addition; reduces chill, increases strength and hardness of cast iron.

Also other special Ferro Chromium and Ferro Chromium Silicon Alloys to meet your needs.

The Iron Age

INTRODUCES

E. Swain Russey, elected president, Warner Gear Div., of BORG-WARNER CORP., Chicago. He succeeds A. P. Emmert, who has retired.

Clyde R. Dean, elected vice-president of the Portland, Ore., Control, CONTROLLERS INSTITUTE OF AMERICA.

J. W. Zinss, appointed vice-president in charge of operations, DURALOY CO., Scottdale, Pa.

Donn D. Greenshields, elected executive vice-president, NATIONAL SCREW & MFG. CO., Cleveland.

W. J. Stebler, elected executive vice-president, GENERAL AMERICAN TRANSPORTATION CORP., Chicago.

George H. Acker, elected executive vice-president, THE CLEVELAND WORM & GEAR CO., and The Farval Corp., its subsidiary.

Frank T. Frey, promoted to executive vice-president, GEUDER, PAESCHKE & FREY CO., Milwaukee.

C. C. Caudill, appointed assistant to the operating vice-president, WHEELING STEEL CORP.

John A. Riley, elected secretary and treasurer, THE TIMKIN ROLLER BEARING CO., Canton, Ohio.

John W. Clark, promoted to assistant secretary, THE RUST ENGINEERING CO., in Birmingham, Ala., and A. J. Jacobs, promoted to assistant secretary, in Pittsburgh.

C. J. Breitwieser, promoted to director of engineering, P. R. MALORY & CO., INC., Indianapolis.

Robert Watt Miller, elected a director of CATERPILLAR TRACTOR CO., Peoria, Ill.

L. C. Chamberlain, named assistant to the director of research, THE DOW CHEMICAL CO., Midland, Michigan; Raymond F. Boyer, becomes head of plastics and high polymer research; and Dr. W. C. Bauman, named director of physical research laboratory.

William W. Garth, Jr., elected to the board of directors, BAIRD ASSOCIATES, INC., Cambridge, Mass.

Roland H. Johnson, rejoins company in an executive capacity, E. W. BLISS CO.

W. F. Martin, appointed comptroller, CLEVELAND CARTAGE CO., Cleveland.

W. Wentz Alspaugh, appointed sales engineer, OHIO KNIFE CO., Cincinnati.

S. C. Leyland, named manager of engineering, Meter Div., WESTINGHOUSE ELECTRIC CORP., Pittsburgh.

Col John Frye, re-appointed manager of sales, COLUMBIA STEEL & SHAFTING CO., and its Summerill Tubing Co. Div., Carnegie, Pa.

George K. Whyte, named manager, factory and sales office, St. Louis, CHASE BAG CO., and R. R. Norcott, promoted to sales manager, Milwaukee.

Paul D. Oesterle, appointed sales manager, Piping Dept., Machinery Div., DRAVO CORP., Pittsburgh.

Frederick J. Lutz, appointed general supervisor of Technical Training, Dept. of Industrial Education, CHRYSLER CORP., Detroit.

Louis H. LaMotte, elected to board of directors, INTERNATIONAL BUSINESS MACHINES CORP., New York.



HORACE DOUGLASS MOULTON, appointed assistant vice-president—Raw Materials, United States Steel Co., Pittsburgh.



K. C. GARDNER, SR., elected chairman and chief executive officer, United Engineering & Foundry Co., Pittsburgh.



GEOFFREY G. BEARD, elected president and general manager, United Engineering & Foundry Co., Pittsburgh.



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Personnel

Continued

Annan Cook, appointed district geologist, eastern states, KENNECOTT COPPER CORP., and Lowell B. Moon, appointed district geologist, north-western states.

R. H. Morse, III, becomes general manager, FAIRBANKS, MORSE & CO., Chicago.

Charles G. Sims, appointed division manager, CUTLER-HAMMER, INC., Milwaukee.

H. R. Smith, appointed aircraft operations manager, KAISER-FRAZER CORP., Willow Run, Michigan; and B. M. Laney, named aircraft works manager.

D. D. Bowe, appointed assistant general sales manager, Aeroproducts Div., GENERAL MOTORS CORP., Dayton.

H. W. Petty, appointed sales manager, R. E. UPTGRAFF MFG. CO., Scottsdale, Pa.

G. T. Van Alstyne, appointed director of advertising and publicity, AIR REDUCTION CO., INC.; and George M. Worden, rejoins the company as assistant to the director.

Robert Grorud, appointed Alnico specialist, CARBOLOY DEPT., of General Electric Co., Detroit.

William C. Grimsley, becomes field engineer, Cleveland office, BULLDOG ELECTRIC PRODUCTS CO.; J. W. Henry, named field engineer, Toledo territory; R. L. Huntley, becomes field engineer, Chicago area; and John R. Sullivan joins Pittsburgh office.

J. M. Selden, appointed manager, Eastern Div., SHELL CHEMICAL CORP., New York.

Dr. Philip Miller, appointed laboratory director, WALTER KIDDE NUCLEAR LABORATORIES, New York.

John Deaderick, appointed manager, Philadelphia office, THE FOXBORO CO.

Malcolm Roberts, has joined the Cleveland office of KURT ORBAN CO., INC., Machine Tool Div.

Kenneth Sloan, joins the New York sales office, of GEO. D. ROPER CORP.



K. C. GARDNER, JR., becomes executive vice-president, United Engineering & Foundry Co., Pittsburgh.



FRANK J. NUGENT, appointed vice-president in charge of sales, The Schaible Co., Cincinnati.



D. C. SHAW, III, promoted to secretary, The Rust Engineering Co., Pittsburgh.



FRANCIS H. WICKLINE, appointed electrical engineer, National Tube Div., United States Steel Co.

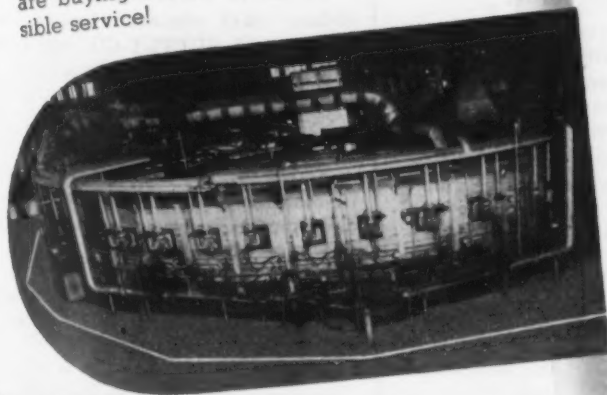
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April 10, 1952

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Cordially,

GEORGE J. HAGAN COMPANY

[Signature]
A. D. Dauch
Vice President

ADD:ACJ

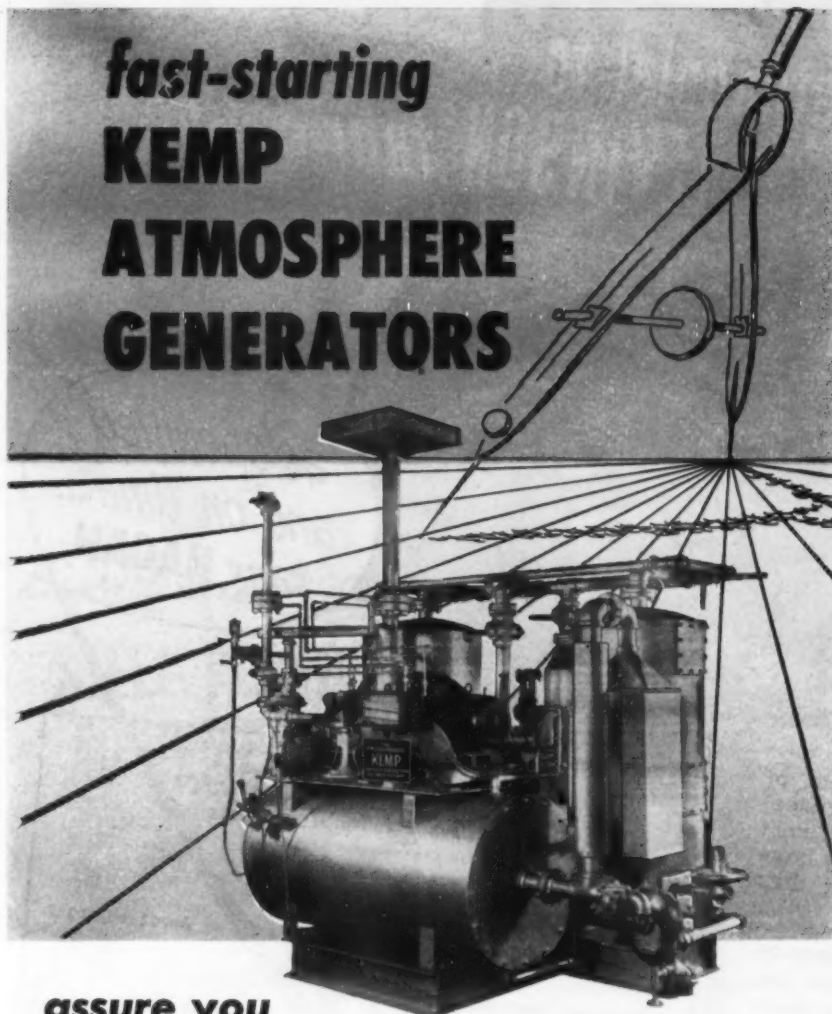
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25 Fabricators of Steel for Industry

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105

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Personnel

Continued

S. C. Shapleigh, named Bridgeport, Conn., branch manager, CARPENTER STEEL CO., and F. J. Weldon, named assistant branch manager.

James K. Lacy, appointed purchasing agent, Houston Div., SHEFFIELD STEEL CORP.

J. E. Mullen, appointed sales representative, in Ohio and Pennsylvania, BRAD FOOTE GEAR WORKS, INC.

J. F. Fyock, appointed district representative, Construction Materials Northeastern district, GENERAL ELECTRIC CO.

Jay M. Sharp, named to newly created position of advertising promotion manager, ALUMINUM CO. OF AMERICA, Pittsburgh.

J. Daniel Johnson, appointed sales representative, FAGEOL HEAT MACHINE CO., Detroit.

Karl D. Jahnke, appointed credit manager, and also elected assistant secretary-treasurer, DODGE MFG. CORP., Mishawaka, Ind.

E. E. Reagle, joins the technical staff of the sales department, Tubular Products Div., THE BABCOCK & WILCOX CO., Beaver Falls, Pa.

Sterling P. Abbey, appointed divisional sales manager, THE LAMSON & SESSIONS CO.; and J. Wallace Nall, appointed sales manager, southern operations with headquarters in Birmingham.

Vernon L. Durrstein, appointed assistant chief engineer, Engine Div., NATIONAL SUPPLY CO., with headquarters in Springfield, Ohio.

OBITUARIES

Arthur E. McClintock, 77, retired Commissioner of the National Foundry Assn., recently at his home in Oak Park, Ill.

Lammot du Pont, 71, former president of E. I. du Pont, de Nemours & Co., Wilmington, Del.

Thomas Cruthers, vice-president, Worthington Corp., Harrison, New Jersey, at his home in West Orange, N. J., recently.

Louis Beauregard, 66, assistant general manager of Walsh Holyoke Boiler Works Div. of Continental Copper & Steel Industries, Inc., suddenly.

They started from scratch—

How to set up A HEAT TREATING DEPARTMENT



By W. G. Patton
Asst. Technical Editor

Starting from scratch, Teer, Wickwire & Co., Jackson, Mich., contract machine shop set up a modern heat treating department capable of processing a high volume of steel parts requiring exceptionally close control. Working a 5-day, 2-shift week, they handle from 150 to 175 tons of king pins, aircraft valve rocker arms, track link pins, hydraulic ram assemblies and other critical parts. Case depths on some parts must be held to 0.004 to 0.005 in. Included in basic equipment are two Homo-Carb furnaces, three salt baths, a tempering furnace, oil and caustic quench baths, a cooling tower. Automatic controls, recording equipment, and special handling devices are built in. Tied to a rigid quality control system, results on carbon grades and such alloys as SAE 9310, 5115, 8617-20, 4140 and 8140 have proved excellent. Special attention was given to bath agitation.

Designing an efficient heat treat department to meet the unpredictable range of requirements of a medium size, high production, contract machine shop presents a formidable problem for an engineer or metallurgist. If the company has had no previous experience in either the design or operation of a heat treat department, the problem is somewhat more difficult.

For over 20 yr, Teer, Wickwire & Co., Jackson, Mich., sent its heat treat work to commercial heat treaters. In recent years, however, as production schedules were advanced and customers' insistence on higher quality of work increased,

it became necessary to establish a heat treat department completely under company control. Although key people in the plant had no experience in operation of a heat treat department, they had had years of experience in checking work produced by commercial heat treat sources.

Heat treat quality factors given primary consideration were (a) control of the case of carburized pieces, (b) control of maximum hardness, (c) maintaining uniform hardness.

Teer-Wickwire is required to control case depth on most parts to within 0.010 in. On some critical parts, case depth limits are reduced to

"Design a quench system which would develop maximum hardness with . . . high uniformity . . ."

0.004 or 0.005 in. In addition, the case must be uniform.

Carbon concentration must be sufficient for full hardening without the excess carbon which results in lowered wear and impact resistance and reduced hardness.

Maximum hardness on a part is obtained consistently only through proper quenching procedure. Uniformity of hardness must be maintained throughout a production run.

To control heat treat quality, it was necessary to establish adequate time, temperature, and atmosphere controls as well as design a quench system which would develop the maximum hardness with any steel or part and also obtain high uniformity.

Teer-Wickwire spent a considerable part of the engineering time in developing quenching equipment which would secure maximum hardness.

This was accomplished through close control of quenching medium temperature, whether caustic water or oil, and through extensive development work on the amount and kind of agitation used in the quench tank. Agitation is supplied in three quench tanks in the order of 1500 gpm through a centrifugal pump.

Output of these pumps can be regulated. In most cases, however, best results are obtained by using the maximum agitation available. In future work, T-W contemplates increasing agitation to 2000 gpm.

Control of agitation was an experimental development program in which many types of baffles were tried to get maximum turbulence in the quenching medium without cavitation.

The heat treating departments, Figs. 1 and 2, occupy only 4500 sq ft. Equipment includes:

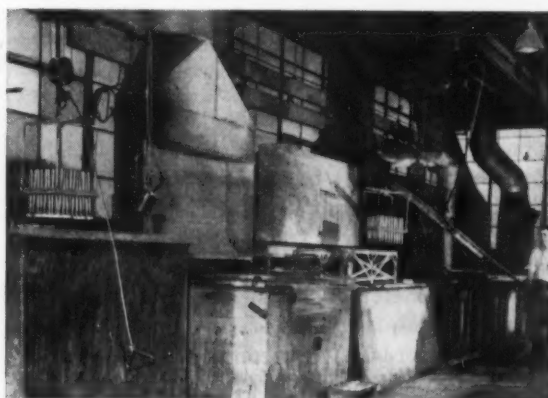


FIG. 1—Overall view of salt bath heat treat equipment. Beginning at the left are gas-fired preheat oven, 1700°F salt bath, 1100°F max tempering furnace, oil quench, caustic quench, pickle tank and 1400°F draw furnace.

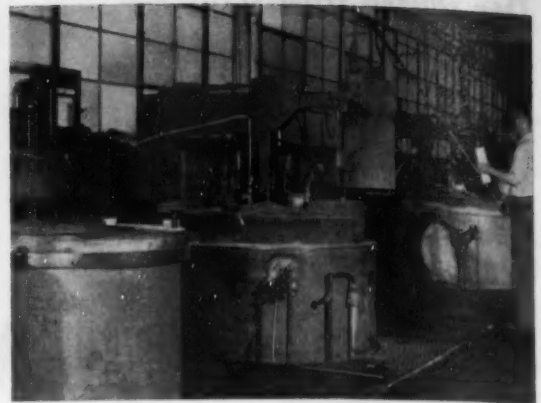


FIG. 2—Operator hoisting work containers used for carburizing. Three baskets make up a furnace load. Lifting straps, attached to the basket, enable the operator to pick up the load easily. L & N controls are at the rear. Cooling tower, center left, is followed by Two Homo-Carb units at right. Department occupies 4500 sq ft.

Two Leeds and Northrup Homo-Carb furnaces. These units can be used for either hardening or gas carburizing, Fig. 2. A typical heat treat procedure is shown in Fig. 2A.

Leeds and Northrup tempering furnaces. Retort size is 28 x 28 in.

Three Ajax Electric Co. salt baths. Two furnaces are rated at 100 kw; one furnace is rated at 65 kw.

One 20-kw Tocco induction heating machine

HEAT TREAT PROCEDURE		DATE: 12-27-51
WORKER'S NAME: KING PIN		S.A.E. 4615
.....553234-B1.....Part No.	Part Name.....	
Control Temperature.....	1700 °F	
Time at Control Temp.....	100 Hrs.	
Control Temperature Draw.....	1400 °F	
Time at Control Temp.....	1 Hrs.	
FURNACE NO. ....A.....	250	Fees./Basket
1. Clean parts in separator.		
2. Load furnace, close, add gas, ign on.		
3a. Start atmosphere at F at follow: 0 Hrs. at heat		
Then..... 1200 °F. Natural Gas for..... 4 Hrs. at heat		
Then..... 1200 °F. Natural Gas for..... 4 Hrs. at heat		
..... 1-2/4 F. Carburizing Fluid for..... 4 Hrs. at heat		
Then..... 1-2/4 F. Carburizing Fluid for..... 4 Hrs. at heat		
..... 0 F. Atmos. for..... Hrs.		
Then..... 0 F. Atmos. for..... Hrs.		
3b. Light flame.		
4. After..... 10 Hrs. at..... °F		
a) Shut off heat		
b) Open cooling vents		
c) Check samples		
d) Leave samples on		
e) Cool to..... 1450 °F		
5. When at..... 1450 °F		
a) Shut off atmosphere		
b) Open furnace		
6. Quench in oil (..... 125 °F) Re 53-63		
a) Hardness re quenched.....		
b) Effective case..... 100% Check before unloading		
7. " " into cooling tower, light gas flame, and close		
a) Hold in tower..... Hrs.		
b) Effective case..... Check before unloading		
8. Clean after quench in separator		
9. Load Air Draw, heat to..... 325-375 °F		
For..... Hrs. Re 57-63		
a) Check final hardness..... Before unloading		
baskets.		
10. Comments.....		
* IF USING FLUID, START AT 1200 °F.		

FIG. 2A shows a standard procedure form for heat treatment of an SAE 4615 king pin at the Teer-Wickwire plant.

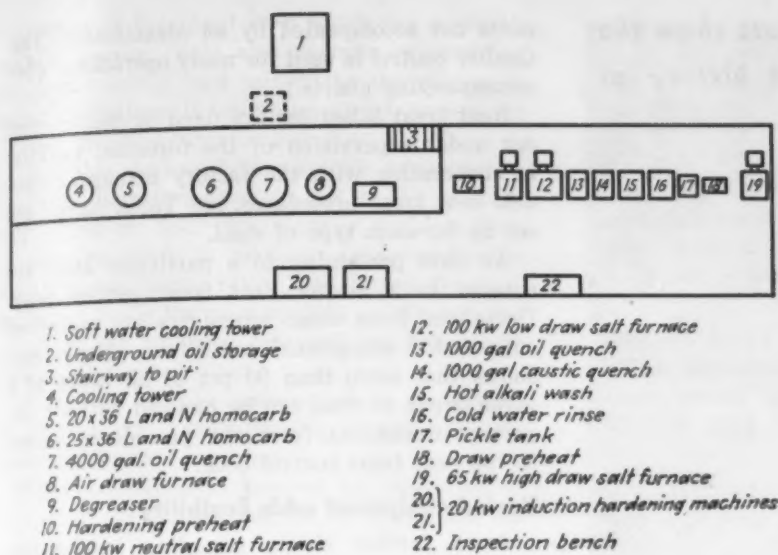


FIG. 3—Layout of heat treat dept requires 4500 sq ft. In-line location of units helps increase daily output of heat treated parts.

operating at 9600 cycles per sec. This machine is equipped with a special scanning device, designed and built by T-W engineers, to handle a variety of parts that are to be selectively hardened.

One Thermonic induction heating machine rated at 20 kw and operating at 450 kc.

Layout shows a floor plan of the heat treat department, including the location of quenching tanks, Fig. 3.

The two Homo-Carb furnaces, Fig. 2, are installed in a pit, approximately 7 ft deep, in which are located three 100-kva air cooled transformers feeding directly into a 1200 amp, 240 v busduct. Grouped around these furnaces is the auxiliary equipment, such as the cooling tower for slow cooling of carburized work on which machining is required after carburizing; the oil quench tank for work to be quenched directly from the carburizing furnaces; the tempering furnace, and the degreaser used for cleaning parts prior to carburizing.

This equipment was installed in a pit to give ample room around the bottom of the furnaces for cleaning and servicing. This has proved a desirable layout, and is recommended highly, Fig. 4.

Salt bath equipment is designed for heat treating high carbon and alloy steels which do not require carburizing and is placed directly on the plant floor with no pit below, Fig. 1.

As all work handled in this department is handled on fixtures, the quench equipment, oil quench and caustic quench baths, is of slightly different type than that used in the carburizing area. However, the same type of agitation and similar baffling is used.

Since the hardening procedure for all work handled in this department is the same (except that some of the work is quenched in oil, some in caustic) the only problem is interchangeability of fixtures. Three basic types of fixtures have been developed. These, with minor variations,

handle all work processed in the department. This simplifies the racks or support problems on the furnace.

A gas-fired, preheat oven helps bring work up to hardening temperature and remove any traces of moisture prior to placing the work in the salt bath. After hardening, the only variable of any importance is the draw temperature.

Because of limitations in the operating ranges of available salts, T-W has installed two tempering furnaces—one operating in the range 400° to 1100°F, and the other from 700° to 1400°F.

A better understanding of the operating problems of this unusually versatile heat treat department is obtained by listing some of the parts treated. Most parts are machined from bar although some are finish-machined from forged shapes.

Parts include hydraulic ram assemblies, tractor brake actuating shafts, automobile king pins, front wheel upper suspension arms and aircraft engine valve rocker arms. The company also produces fuel pump eccentrics, lawnmower motor

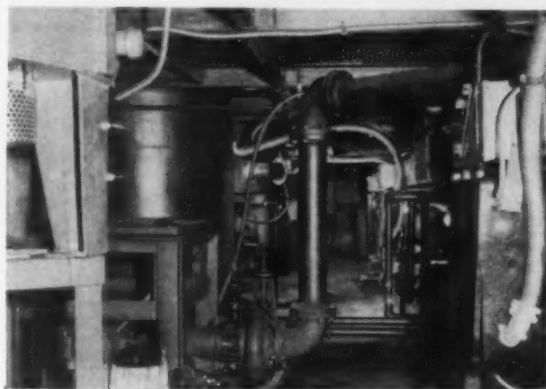


FIG. 4—View of the basement. Large pump in the foreground is 25 hp, 1500 gpm centrifugal unit. Intake pipe connects 4000 gal storage tank. Smaller pipes lead to heat exchanger and controls.

"Recording instruments show the complete heat treat history of each part . . ."

cams, steering idler arms, tank track link pins, and amphibious vehicle link pins. Its heat treating department has been approved by the U. S. Air Corps.

Many carbon grades and a range of alloy steels are hardened to meet automotive, ASTM and service specifications. Alloy grades regularly handled include SAE 9310, 5115, 8617-20, 4140, and 8140.

At capacity operation, the department can handle from 150 to 175 tons of steel in 5 days working two shifts.

The tonnage that can be processed is affected by the type of work. Parts requiring heavy case depths of 0.060 to 0.070 in. take more furnace time than parts requiring 0.010 to 0.015 in. case. Parts of heavy section take longer to heat in the salt bath equipment than parts of light section. This is also true of the induction equipment.

Emphasis has been placed on control methods that permit handling a variety of steels and parts without danger of mixing or using the wrong heat treatment. All steels are tagged on arrival, using a double tag. The lower half of the tag moves with each batch of steel parts. The upper part remains with the steels.

Employees may not accept a batch of steel or

parts not accompanied by an identification tag. Quality control is used for many operations. (See accompanying charts.)

Heat treat schedules are fixed by and carried out under supervision of the foreman, working in cooperation with the factory manager. Specific heat treat procedures, see Table, have been set up for each type of steel.

All data pertaining to a particular steel are entered in a master heat treat control book. Deviations from these procedures are permitted only under exceptional conditions. Experience shows that more than 90 pct of all heats of a given grade of steel can be handled without important deviations from the procedures shown in the heat treat control book.

Varied equipment adds flexibility

As a further check, recording instruments show the complete heat treat history of each part. Careful control of heat treating operations is maintained by regular, periodic checks of hardness, case depth, and other measurable metallurgical factors.

Two pieces of heat treating equipment, unusual for a small heat treat operation, add flexibility. First is an oil quench tank previously described. The second unusual piece of equipment is the special adapter designed and built for the Tocco induction hardening unit, Fig. 5.

Since most of the work processed on the Tocco machine requires hardening only, the company was faced with the problem of hardening a number of parts whose diameter and length of hardened area varied considerably. It was believed the coil design and selection of a suitable transformer ratio could be adapted to permit maximum power output of this machine on any part it might be necessary to run. Consequently, the basic problem was to make the fixtures adaptable with a minimum of setup.

To do this, a Bellows air cylinder was mounted vertically on the framework, built up from the base of the work table, and a Hydro-chek unit, which permits variation of the rate of travel of this air cylinder, was attached, Fig. 6. A delay timer was connected to the solenoid valve which supplies air to this cylinder.

Induction heating closely controlled

This gives the required time necessary to bring the part up to heat: That portion of the part within the boil is brought up to heat prior to beginning of scanning.

The delay timer then energizes the solenoid valve which, in turn, supplies air to the scanning cylinder. This cylinder then scans the part through the coil and quench ring at a predetermined rate.

A cam attached to the scanning unit, which is adjustable in relation to the part being heat treated, contacts a limit switch to cut off the induction heating current at the proper time. This controls the length of the part hardened.

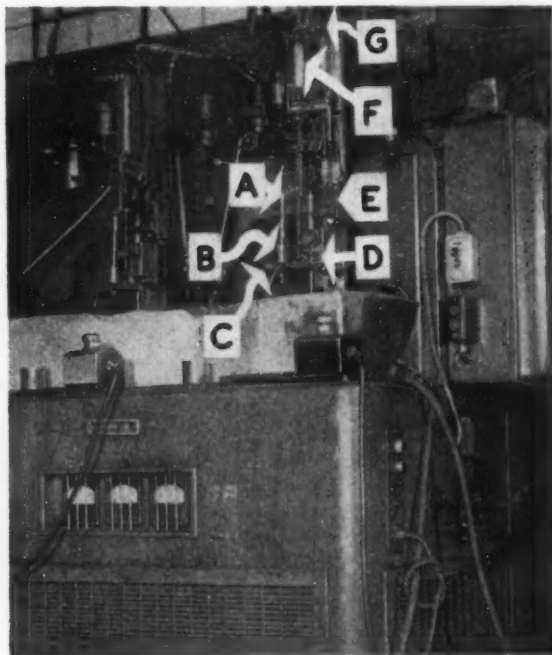


FIG. 5—Tocco 9600 cycle machine. (A) Holding fixture, (B) centering bushing, (C) heating coil, (D) limit switch for power, (E) limit switch controlling travel, (F) air cylinder for scanning, (G) solenoid valve.

regardless of the speed with which the scanning cylinder moves. This also permits overheating the part slightly, and minimizes the effects of minor variations in scanning speed caused by line air pressure variations.

With this device, T-W was able to harden a range of diameters from $\frac{1}{2}$ up to $1\frac{3}{4}$ in. with only three or four transformer ratios. Only changes required, in addition to selecting the suitable transformer ratio, is to change the locator which holds the part upright in the coil and to adjust the scanning rate and the cam which cuts off the power input.

With these simple changes, which require 15 to 20 min., the plant handles 90 pct of parts processed in this machine.

Minor adjustments required for operation of this setup are quickly learned by production operators.

On the thermonic radio frequency induction heating machine, Fig. 6, no progressive hardening was attempted. Company engineers have developed a fixture which holds the part within the heating coil, lowers it rapidly into a quench ring for a spray quench, then raises the part back up into the coil for unloading and loading.

By using duplicate fixtures on either side of the work table, and an automatic air-operated, high frequency switch, and dual output transformers, the company is able to use the machine to its maximum efficiency. While the part on one side is being quenched, the part on the opposite side is being heated and vice versa. Thus, the machine is developing its maximum power for approximately 99 pct of the time in operation.

Again air cylinders are used with electrical solenoid valves tied into timers controlling the power output of the unit. By doing this, variations due to operators is eliminated.

Time during which the part is heated is accurately controlled by a timer. At the end of this time, the part is lowered into the quench and held for a predetermined number of seconds. It is then brought out of the quench back to loading position, while enough inherent heat is left in the part to provide an automatic draw.

By doing this, T-W hardens carburized pieces

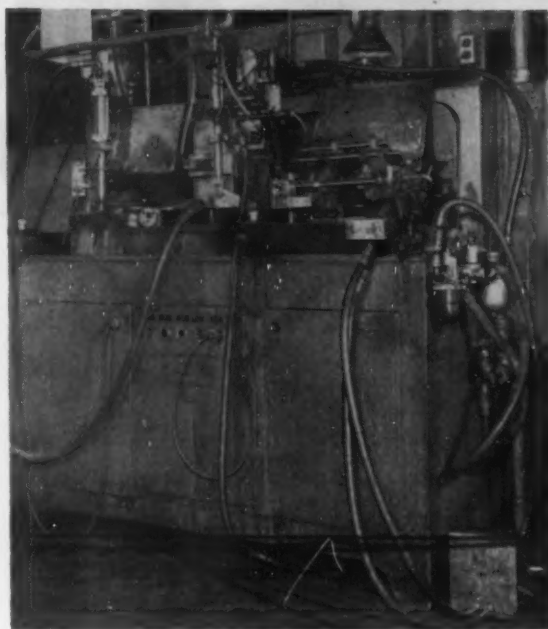


FIG. 6—View of Thermonic radio frequency induction heating machine. Operator places part in the fixture at the front, fixture indexes one notch, permitting loading another part. After heating, part indexes for quenching.

consistently to Rc 62 to 65. In subsequent centerless grinding no difficulty from hardening or grinding cracks is encountered.

Some auto engine parts hardened in this manner have withstood exceptionally hard usage without failure in service. An example is the fuel pump eccentric used on a V-8 engine for which the company is a 100 pct supplier. A critical part, since it has been processed on this machine, there have been no reports of service failure for any part.

Numerous pump and quench tank designs were tried to provide a fast oil quench. All early attempts to provide a rapid quench were defeated by the formation of air bubbles. Finally a quench tank setup in which a circuit is partly closed and partly open was tried. Formation of bubbles and froth on the oil were eliminated and desired quenching rates attained. Benefits of this unusually rapid cooling rate have been adequately demonstrated over the past $2\frac{1}{2}$ yr.

NEW BOOKS

"Height-Combination Tables and Heat Expansion Calculator." Lists gage blocks to be used in constructing combinations for any dimensions from 0.0001 to 1.0 in. in steps of 0.0001 in. Heat Expansion Calculator gives corrections for differences in coefficient of expansion between gage blocks and parts, other than steel, being checked with gage blocks. The DoAll Co., 254 North Laurel Ave., Des Plaines, Ill. \$2.95.

"Management Controls In Industrial Research Organizations," by Robert N. Anthony. Scientific research, non-standard and individualistic, poses a problem of control for industrial management. Dr. Anthony clarifies the problem of control of research activity and provides a source book of currently useful control techniques. Division of Research, Harvard Business School, Soldier's Field, Boston 63, Mass. \$6.75. 537 p.



Forming is faster now—

Big Automatic Machines

PARTS FOR B-57A Canberra are being formed on Sheridan stretch press at Glenn L. Martin Co., Baltimore, Md. Twin-jet bomber is night intruder version of English ship.



By E. N. Laurance
Division Superintendent
Detail Manufacturing
The Glenn L. Martin Co.
Baltimore

An advanced production program in pilotless bombers, guided missiles and rockets at the Glenn L. Martin Co., Baltimore, plus the new materials used and the critical nature of the projects involved has made use of the newest types of sheetmetal forming machinery necessary.

Of particular interest among the new pieces of equipment at the Martin plant are the 300-ton Sheridan stretch press, the H-12 Hufford stretch press and the Model 2015-EXX 20-ft Farnham forming roll. New applications in use of these machines have been developed by Martin in co-operation with machine specialists.

Stretch-wrap forming originated during World War II, and has developed rapidly. Today's machines are far advanced over wartime models. The process provides a fast, simple way to make complicated shapes at relatively low cost. Parts are uniform, speeding the assembly of aircraft with a minimum need for special hand-fitting and work-overs. Both short and long runs are practical and duplicate parts are easily formed at any subsequent time.

Fuselage and wing panels are produced on the 300-ton rising-bed type Sheridan stretch-forming machine. The machine embodies two 150-ton hydraulically-operated table-rams and has a capacity for sheet 100 in. wide.

Stretching force is applied to the sheet by raising the die table on its two rams, movement of which is hydraulically controlled from a centrally-placed panel. Rams can be operated independently.

Warmed up production schedules for more and bigger planes, guided missiles, rockets and pilotless bombers have put the heat on sheetmetal fabrication departments at Glenn L. Martin Co., Baltimore. Now assembly lines are getting more accurate parts faster because Martin eliminated hundreds of manual operations by installing big, automatic forming machinery. Fuselage and wing panels are rolling off a 300-ton rising bed type Sheridan stretch forming press. An all-hydraulic Hufford stretch wrap forming machine features push-button automatic controls. Irregular contours and leading edges of parts for the Martin P5M-1 Marlin flying boat are being made on a Farnham forming roll.

A vertical to horizontal movement of the power-driven gripper jaws permits grip of sheet to be tangent to line of stretch while in operation. This makes for more accurate stretching of contoured skins and contoured leading edges. The gripper jaw beam is equipped with adjustments for making tapered shaped parts.

The die table, 98 in. long x 18 in. wide, has adaptable features for die table extension, and affords adequate support for dies equal in length to the maximum width of sheet that can be held in the jaws.

Maximum travel distance between gripper jaws is 122 in., and minimum closed distance is 2 in. Jaws can be swivelled horizontally by individual operation of actuating lead-screws to a position 10° either side of the centerline of the die table.

Each jaw is pivoted at its extreme end in a heavy trunnion, which permits the jaw to take up a position normal to the sheet during the forming operation. Large radially-disposed ribs that pivot with the jaw make it possible to lock the jaw-trunnions. To minimize sheet-breakage when the jaws are in a fixed position, a curved cheek is fitted above the opening of each jaw. This increases the radius of the bend in the sheet as the die table ascends.

The Model A-12 Hufford stretch-wrap forming machine is all hydraulic in operation. It consists of two separately hinged arms fastened to a central stationary bed to which the power supplies are mounted. The arms can be independently actuated or made to move in unison, depending upon the wrapping requirements of the workpiece. Dies are coded with stretch-wrap

Revolutionize Sheetmetal Operations

information to simplify setup when subsequent runs are required.

Supported on each arm is a bracket containing the tension cylinder. These brackets may be moved along the arms by a power drive to obtain correct spacing between the jaws for any work size within capacity of the machine. When located, they are keyed against further movement. Work up to 208 in. long and sheets up to 20 in. wide may be handled. Tension cylinders exert a total maximum stretching force of 57,700 lb at 2000 psi hydraulic pressure.

One of the most recent developments in the Hufford machines is push-button automatic control. Formerly all tensions were manually controlled by the operator. On the Model A-12 these stretching tensions, rate of arm travel and return are pre-set. Once a job is on the machine and adjustments made, the operator has only to press the correct button for the machine to complete various operations. Parts are uniformly stretched and formed and each is identical with the other.

Each arm is independently operated by its own actuating cylinder, and rotates about a fixed pivot pin, up to 90° arc. This independent movement makes possible the stretching of widely divergent contours on ends of parts.

The tension cylinder bracket is adjustable along the arm in 7 in. increments. This adjustment provides a range of distances between jaws varying from 24 in. with tension cylinders fully extended, to 208 in. with tension cylinders fully retracted.

A two-stage pressure control valve provides an independent setting for wrapping pressure, another for final stretching pressure, and provides a means of unloading the pump when the

press is not forming parts. An automatic pressure increaser is available to increase tension on the part during forming.

Need for efficient fabrication of leading edge skins, tapered and straight, and other rolled parts of aluminum alloys led to design of the Farnham forming roll. On this machine parts may be formed after all openings have been cut and holes drilled in the flat sheets.

Before installation of the Farnham forming roll a brake was employed and hundreds of operations were necessary in fabricating rolled parts. It sometimes required 2 or 3 hr to contour a single part.

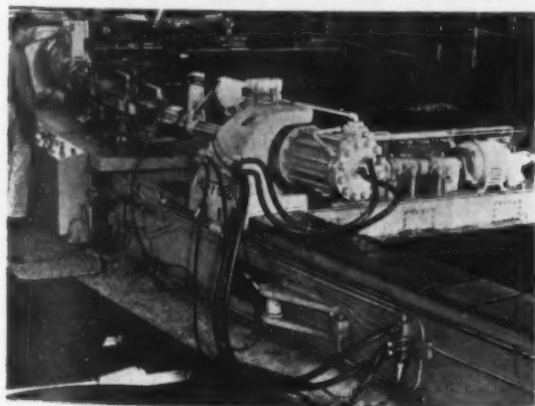
By pre-setting the Farnham, hundreds of skins can be formed with perfect radii with one pass, requiring from 3 to 6 min per part. Time saved varies from 2 min to 2 hr, according to the part and number of operations which would have been necessary under the old method.

Another feature is a magnetic shoe in the forming roll. Permanent magnets on the upper roll hold up the top roller, so it is unnecessary to pry the roll up to insert a new sheet.

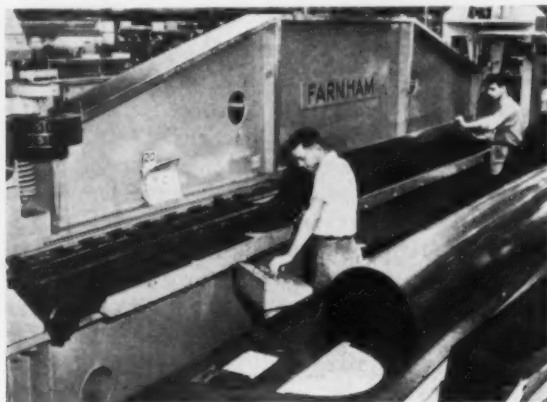
Maximum sheet length handled on the Farnham is 20 ft, with maximum thickness 0.120 in., regardless of sheet length. Minimum radius to be rolled is 2 in. Motor equipment consists of two double speed screw down motors, 3 hp and $\frac{3}{4}$ hp, and one double speed drive motor.

Irregular contours and leading edges are formed on the Farnham. In forming such parts as the auxiliary tanks on the Navy's Martin P5M-1 Marlin flying boat, the setups are easily changed as the work progresses around the tank.

In most cases only one person is needed to operate the Farnham, while two men were required to perform similar operations on the brake.



ALL-HYDRAULIC operation is feature of Hufford A-12 stretch-wrap forming machine. Parts are uniformly stretched and formed simplifying operations.



TAPERED AND STRAIGHT leading edge skins and other rolled aluminum parts are fabricated on Farnham forming roll machine. Magnetic shoe speeds operations.

Get more coverage with ELECTROSTATIC PAINTING

More than three times the number of chairs per gal of paint is the record chalked up for electrostatic paint spraying at ChromCraft Div., American Fixture & Mfg. Co., St. Louis. With a Ransburg No. 2 unit, the company reports overall investment in painting equipment is less and more uniform coatings are produced. Paint is fed to a rotating cone head. A powerful electrostatic field transforms the paint into a spray of fine, electrically charged particles. These are attracted to the grounded, slowly rotating chairs riding by on a conveyor. All spray is deposited and ventilation requirements have been cut in half.

Late in 1951, ChromCraft Div. of American Fixture and Manufacturing Co., St. Louis, started producing metal chairs on government contract in addition to the company's regular civilian chair line.

Three types of service chairs are turned out. One is a straight, armless chair for the Army. Another, for the Air Force, is a swivel type with metal frame and base. The third type, also for the Air Force, is a straight, arm chair, Fig. 1. All are cushioned and have padded back rests.

Assembly line production is an old story to ChromCraft. However, the job presented an entirely different metal finishing problem. A fast, efficient spray painting system was needed to meet production volume demands. The process must fit into a minimum of floor space. The new installation requires only about one-third as much floor space as a spray booth set-up designed to do the same job with hand spraying.

Advantages of the new installation as compared with conventional spray booth painting

are: (1) More chairs per gallon are being painted; (2) overall investment in painting equipment has been reduced; (3) more uniform coatings are produced; (4) more surface is being covered per gallon of paint. The paint used is the same quality employed for hand spraying.

The new Ransburg No. 2 Electrostatic Process was selected and installed with a Webb conveyor. The process embodies a new and unusual method of applying atomized liquid coatings.

The chairs are first washed in a five-stage washer, then bonderized. A conveyor carries the chairs past a new type spray "gun" which consists essentially of a hollow, cone-shaped head, Fig. 2. The coating material, reduced to normal spray viscosity, is metered at a constant rate to the apex of the head. Rotation of the head at the rate of 900 rpm spreads the material uniformly over its inner surface, causing the material to flow evenly to the outer edge of the head.

A source of high potential, having one terminal connected to the head, creates a strong elec-

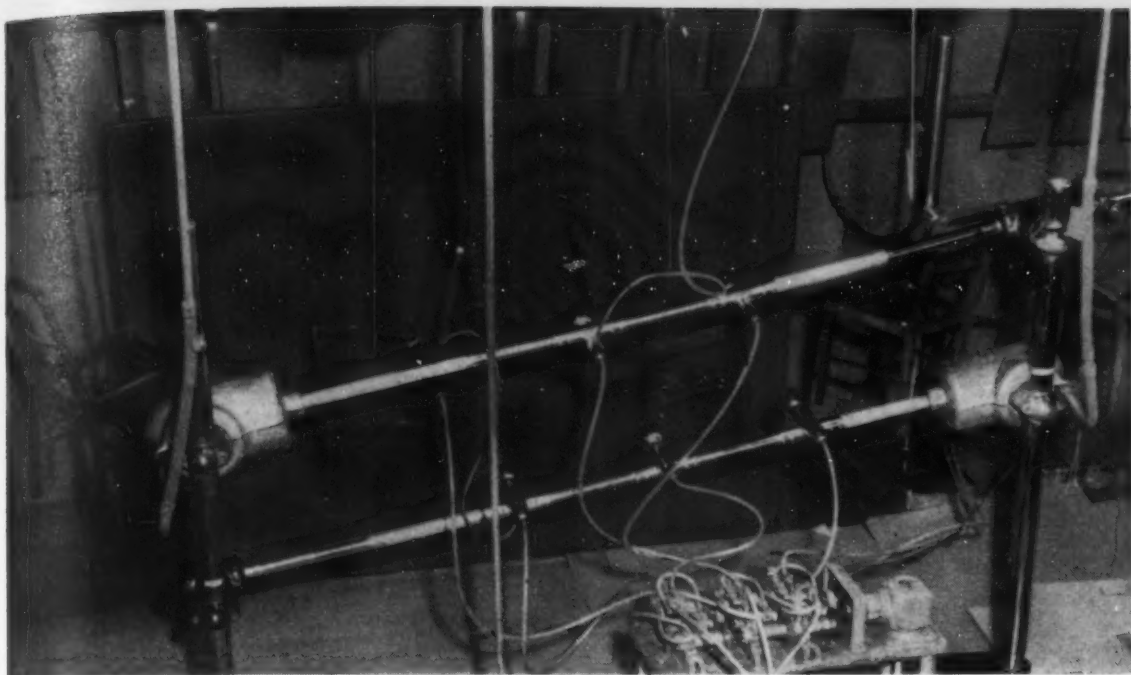


FIG. 2—The painting heads shown here revolve at a rate of 900 rpm. Heads are adjustable laterally and vertically.

trostatic field between the head and the article to be coated, which is grounded by the conveyer. The force of this field transforms the material into a spray of fine, electrically charged particles and creates an attraction that pulls the spray particles to the grounded article. An unusual feature of the method is that, while the paint flows evenly onto the part, the spray is so fine it can scarcely be seen.

ChromCraft employs a Ransburg unit consisting of three triple heads to handle the automatic spray finishing job. One set of triple heads is located on one side of the conveyer line and two others are on the opposite side. Location of the heads is adjustable both laterally and vertically.

Chairs are spaced on 36 in. centers and are rotated slowly in the cleaning zone. Conveyer speeds range from $7\frac{1}{2}$ to 9 fpm.

Per gallon of uncut coating material, ChromCraft is getting an average of 46.5 chairs on the 2-piece swivel chair and the armed, straight chair. On the armless straight unit, an average of 53.3 chairs per gal of uncut enamel is reported. Number of square feet of surface painted per gal is substantially greater than with hand spraying methods, since hand spray would produce around 12 to 18 chairs per gal.

All of the coating material leaving the spray head is deposited on the chairs. In this particular installation, a spray booth is used and ventilation is provided at a rate that is approximately half that which would normally be used. However, the majority of Ransburg No. 2 installations use no spray booths since there is no over-spray material to be exhausted.



FIG. 1—Electrostatic painting makes it possible to paint 46.5 chairs with a gal of enamel, more than three times the number of chairs per gal possible with a handspray.

No compressed air is used in the No. 2 guns so wastage of paint—which is inherent with air atomization—does not exist, according to the manufacturers of this equipment. ChromCraft is currently finishing several hundred chairs per day using the electrostatic painting method.

Grind your gears for accuracy—

Basic Gear Grinding Methods COMPARED

Grinding can correct gear tooth form and spacing errors. It is particularly useful after hardening. Each of the three basic methods, form grinding, line grinding, and point grinding, has advantages and limitations. Hardened and ground gears can make transmissions 50 pct lighter, 40 pct smaller, and cheaper than unground gears of equal capacity.



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Any inaccuracy in an operating gear will show its effect in deviations from the original motion, and in uneven distribution of stresses in the gear teeth. Both have major effects on the operation of a mechanism. In control gears, the deviation will induce functional errors. In power transmission gears, deviations will induce noise and vibration, with eventual damage to moving parts or structures.

Gear teeth of inaccurate shape will contact at or near the edges instead of on their full length, resulting in stress concentrations both on the contact surface and in the bending section where the tooth joins the rim of the gear. Also, the effect of inevitable inaccuracies of gear mountings and deflections of the supporting structures, will be greatly aggravated by inaccuracies of the gear teeth. Accurate final dimensions of gear teeth may be obtained by a careful cutting process, providing the material is soft enough. Generally, 240 BHN is the upper limit of hardness for precision gear cutting. In some cases gears of up to 350 BHN have been cut to good dimensional accuracy. The true limit is determined by factors like tolerance specified for the completed gear, accuracy and rigidity of the machine, size of the workpiece, and economic considerations. Generally, gears up to 6-in. pitch diameter may be cut to a spacing uniformity of 0.0008 in., and 0.001 to 0.002 in. in gears up to 20-in. pitch diameter.

Shaving after cutting gives accurate tooth form and pitch diameter, but it cannot essentially improve uniformity of spacing. Lapping will improve surface finish but it does not improve dimensional accuracy.

Where a hardened gear tooth surface is required, the hardening distortions are added to

any inherent inaccuracies of the cut gear. Case hardening, performed on a large production basis in carefully controlled furnaces, produces distortions of between 0.001 and 0.004 in. on gears in the 3 to 12 in. diam range. For high quality instrument gears and for transmission gears of high speed and power capacity, these deviations from geometrical perfection are intolerable.

The only known practical process for correcting the dimensional accuracy of a gear after hardening is grinding of teeth and mounting surfaces. Gear tooth grinding is a specialized art, comprising several different methods, each with its own characteristics, limitations and advantages.

Bases on the method by which the tooth form is produced the three grinding methods are form grinding, line generating grinding, and point generating grinding.

Fig. 1 shows the most common methods of form grinding. The grinding wheel is dressed to the tooth form to be ground, and passed through the spaces between the teeth, grinding the flanks to the form of the wheel. The essential feature of this grinding system is its independence of tooth form, which makes it applicable to toothed parts other than involute gears, like splines or ratchets.

The disadvantages of this method are the heat developed at the contact area between wheel and teeth, and the wear of the wheel. The frictional forces are determined by the contact area, sharpness of the wheel grit, hardness of the material being ground, and feed and speed of the wheel. In form grinding, the contact area is large, leading to high frictional forces. The frictional forces are transformed into heat gen-

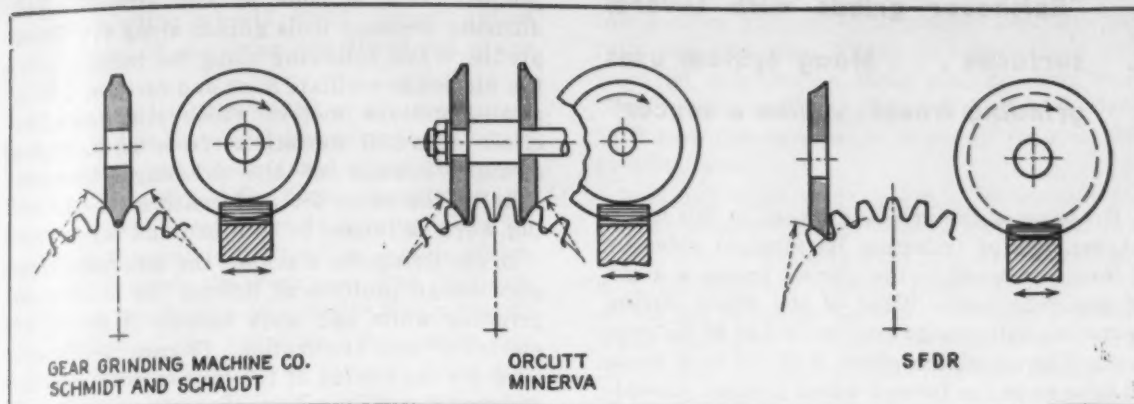


FIG. 1—Three basic types of formed-wheel grinding systems.

erated at the grinding area. This heat could anneal the teeth leading to distortions and internal stresses, and destruction of the gear metallurgical properties. Therefore, coolant must be applied.

Size and shape of the teeth is dependent on size and shape of the working portion of the wheel. Thus any wear of the wheel will change the gear tooth dimensions. This places restrictions on the depth of cut that may be taken in the final operation, and on the number of teeth that can be ground without redressing the wheel. In order to keep wheel wear within acceptable limits, hard bonded wheels are used. In such wheels the cutting grit which becomes dulled is not readily removed from the wheel surface. The result is further increase in friction and heat. Thus a limit is given for the permissible hardness of the bond of the wheel.

The formed-wheel grinding system is applicable to spur and helical gears, external and internal, of small and medium dimensions. Undercut tooth forms cannot be ground. The upper size limit is given by the number of teeth that may be ground without redressing of the wheel, by the tolerances, and, on highly stressed gears such as in aircraft power transmission, by considerations of metallurgical changes due to heat developed in grinding.

The common straight wheel generating proc-

esses are shown in Fig. 2. The involute form of the gear teeth is produced by generation from the straight contour of a basically conical wheel, or from the face of a flat wheel. The wheel contour represents the flank of the basic rack which meshes with the gear. The involute form is thus produced by a straight line which is tangent to the curved surface being ground. The contact area between grinding wheel and gear tooth is smaller than in the form grinding process. But the large curvature of the involute still results in a practical area contact with the wheel, leading to a rate of heat generation which requires ample cooling. Consideration of metallurgical nature due to heating and cooling of the ground area apply as with the formed-wheel process.

The involute generating motion, as used on one machine in general use, is shown in Fig. 3. The workpiece is mounted on the axis of a master gear which meshes with a master rack. The rack is geometrically equivalent to the contour of the grinding wheel. As the slide carrying workpiece, spindle, and master gear, is reciprocated across the longitudinal axis, the rack imposes the rolling motion over the master gear onto the work. The grinding wheel is passed longitudinally along the gear teeth. Indexing is done at the end of the stroke, when the wheel is out of the tooth space.

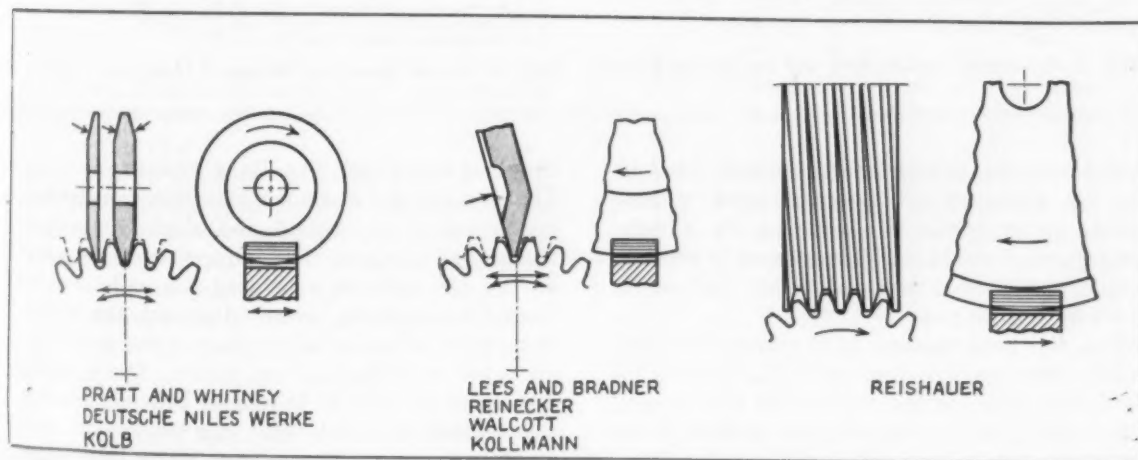


FIG. 2—Types of straight wheel generating grinding systems.

"Reishauer grinds with several surfaces . . . Maag system uses grinding wheel . . . like a saucer"

Dressing of the grinding wheel, in this method, consists of trimming its straight sides by pointed diamonds to the correct pressure angle of the gear teeth. Wear of the wheel during operation will change size and shape of the gear teeth. The wheel, therefore, is of the hard bonded type as in the formed wheel process. Considerations of limitations of number of teeth ground between wheel dressings, caution against burning at the tooth surface, and tolerance limitations connected with grinding wheel wear are similar to those applying to the formed wheel process.

The gear grinding method of Reishauer, shown in Fig. 2, also uses the straight line generating principle. The grinding wheel has geometrically the shape of a worm, and the grinding process as a whole may be compared with the hobbing method of gear cutting.

The Reishauer method grinds with several surfaces at one time, and indexing time is eliminated. This greatly reduces the actual grinding time. However, time for setup and dressing and redressing is greater. The grinding worm is produced from a solid wheel by first crushing

profiled. This is done by two straight-sided diamond dressing tools guided along the wheel profile. While following along the basic profile, the diamonds oscillate back and forth in a fast, small-amplitude motion which eliminates the effect of small deviations from an accurate straight contour of the dressing diamonds. Finally, the outer circumference of the grinding worm is turned to be round and concentric.

In the Reishauer machine, the otherwise complex design problem of linking the motions of grinding worm and work spindle is solved by electrical synchronization. Change gears are used for the setting of the proper ratio, and individual electric synchronous motors drive work spindle and grinding worm. Constant line voltage without fluctuations is an essential requirement. A new Sheffield machine (see p. 135) uses, like the Reishauer machine, a straight line method comparable to the hobbing method of cutting gears.

Wear of the grinding wheel in the Reishauer process will affect size and shape of the ground teeth, in a manner similar to that of other straight wheel generating processes. Hard bonded wheels are a requirement, therefore, and the considerations for use of coolant, metallurgical properties, and number of teeth that may be ground are the same as for previous methods.

If the grinding wheel contacts the involute flank of the gear in only a theoretical point, then the ground curve becomes independent of the

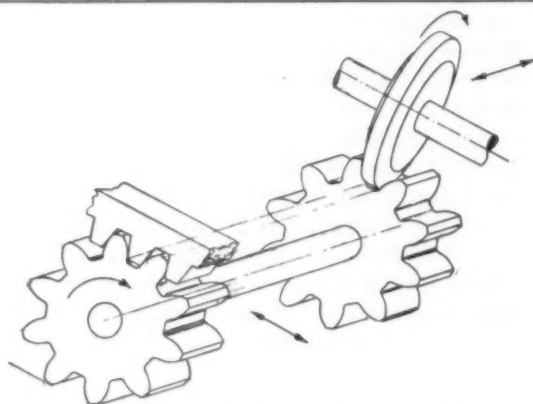


FIG. 3—Generating involute form with straight-sided wheel.

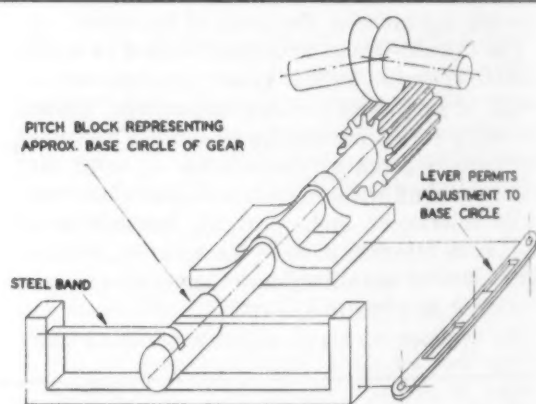


FIG. 4—Involute generating linkage of Maag gear grinder.

the approximate profile into the wheel. This is done by pressing a hardened steel roller, grooved to proper profile, against the slowly rotating grinding wheel. This process is repeated until the desired depth of helical groove in the wheel is obtained.

Next, the root section of the groove in the wheel is crushed to a greater depth, in order to afford clearance for the tips of the gear teeth. This is done with a disc-shaped crusher, in a manner similar to the first profiling operation. Then the straight flanks of the wheel are finish

shape of the wheel. The Maag system shown in Fig. 4 makes use of such a principle. The grinding wheel is of conical and slightly concave shape, like a saucer. The inner side of the edge on the circumference is used for grinding. In the lowest position, nearest the root, the wheel is tangent to the involute flank at one point; in all other positions at two points. The contact area is so small that frictional heat generation takes place at a rate that can readily be dissipated by natural cooling. Maag machines therefore work without coolant, and use soft

bonded grinding wheels which permit dulled grit to break off and bring new sharp grit to the surface.

The tooth form is retained by the generating linkage, and as the wheel generates the involute by a point, wheel wear could affect the tooth thickness though not the form. Therefore compensation for wheel wear is accomplished by mounting the grinding wheel on a slide which can move towards the workpiece. The readjusting device is operated by a feeler which checks the location of the grinding wheel every two seconds during the grinding process. A flat diamond at the feeler surface exerts a predetermined amount of pressure on the wheel, and when the wheel edge has worn 0.00004 in., the compensating device moves the wheel forward to restore the grinding edge to its original location.

Thus any number of teeth, on one or many individual gears, are ground to the essentially same form and size as the first tooth. This makes the point generating system with wear compensation most important for production of small gears that must be held to utmost uniformity, like the planetary pinions of aircraft engine reduction drives, and equally for large gears having a number of teeth too large for other grinding systems. Grinding of these large gears makes it possible to carburize the teeth after cutting.

By the increased strength and wear resis-

this pattern has proven to possess desirable oil retaining qualities. Where this pattern is not required, grinding on Maag gear grinders may be done with only one point of the wheel edge. This zero pressure angle grinding reduces the grinding time.

Modified involute forms may be ground by formed wheels if the counterpart of the desired tooth form is dressed on the grinding wheel. An accurate template is made, from which the diamonds are guided in the wheel dressing process. Maag machines provide attachments by which the desired involute modification may be adjusted to the desired value, and the new tooth form is then produced as the linkage imposes an additional rolling motion to the gear in the generating process.

Grinding of internal gear teeth may be performed only by those processes which are adaptable to the concave tooth form of the internal gear. The formed-wheel system is readily applicable. The point generating system is equally adaptable for internal gears. It will uniformly grind any number of teeth, and internal gears are mostly used in epicyclic gear trains where the internal gear is the largest in the set, with correspondingly large numbers of teeth.

For grinding of bevel gear teeth the geometry of the bevel gear must be taken into account. The size of the teeth, the pitch, and the curvature of the involute decrease with the distance from the cone center. This eliminates any grind-

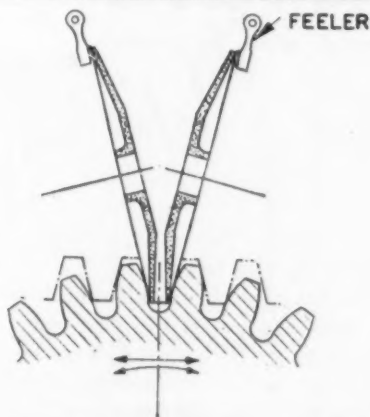


FIG. 5—The Maag point generating gear grinding system.

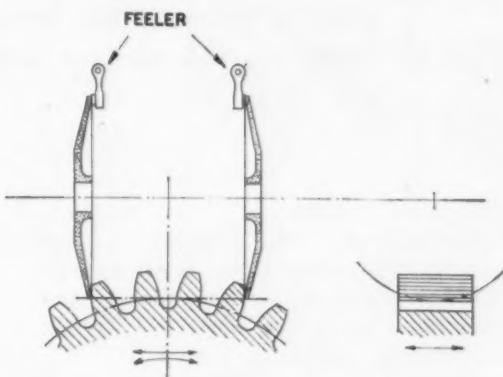


FIG. 6—Point generating system for zero pressure angle.

tance produced by carburizing, together with the accuracy obtained by grinding, the power transmitting capacity of such gears may be increased to 300 pct of that of a conventional heat treated and cut gear.

Fig. 5 shows the principle of involute generation used on Maag machines. As the curved edge of the grinding wheel is rolled along the involute curve of the gear tooth, the grinding ridges intersect forming the criss-cross grinding pattern that is characteristic for this grinding system. For gears operating at high speeds

ing system with fixed tooth form or with fixed pitch, such as form grinding, or generating with two or more wheels at fixed distance. The straight wheel system, with only one wheel of which only one side is operating, is feasible, but has not been developed to practical use.

The Maag point generating system has been extended to grinding of radial and oblique tooth bevel gears. The Maag bevel gear grinders use two grinding wheels operating individually in reciprocating motion, so that the narrow space near the cone center is clear for one wheel.

Develop new technique FOR METAL STRUCTURE STUDY



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Motion-micro study, an unusual technique developed at The Johns Hopkins University, may point the way to a new understanding of phenomena affecting metal structures. A motion picture camera hooked to a microscope was used to take pictures of liquid-solid transformations of low melting point alloys. A special micro-tensile testing machine, equipped with strain gages and Dynalog recorder, was developed to deform and measure the extent of strain. This combination setup was used to study plastic deformation of high purity aluminum crystals grown by gradual solidification from the liquid metal.

Motion-micro studies of metal movements conducted at Johns Hopkins University under sponsorship of the Office of Air Research, U. S. Air Force, have resulted in development of new techniques for use in studying phenomena affecting metal structure.

Liquid-solid transformation phenomena can be observed microscopically because (1) transformation is progressive, (2) progressive solidification is discontinuous, and (3) metal shrinkage during solidification is continuous.

Metal when molten seeks a common level and presents a smooth, mirror-like reflecting surface. After solidification the surface is ridged and furrowed. To observe surface irregularities of the solidified mass magnifications necessary vary from 15 to 125 diameters. To achieve these magnifications the normal metal microscope objective lens must be used within 1/16 in. to 1½ in. of the metal surface. An expensive lens might be damaged or ruined if brought too close to the mass of molten metal due to its high tempera-

ture. Low melting point alloys were used to avoid damaging the lens.

As the metal cools it shrinks and the surface recedes from the lens. If the phenomenon is to be observed the surface must be kept in focus at times. This can be done by learning to anticipate the rate and extent of movement of the surface.

So many actions occur simultaneously it is impossible to keep track of them all. The solution is to take a microscope-motion picture of the action. The problem of maintaining proper focus on the camera film as the specimen moved was solved by selecting the proper optics for the motion picture camera and placing the camera at one eyepiece of a binocular system. When focus is proper for the eye of a person looking into the free ocular of the binoculars, it is also proper for the motion picture camera looking into the other one.

Using these techniques, studies have been made in liquid-solid transformation, plastic deformation and cleavage. Illustrations of this

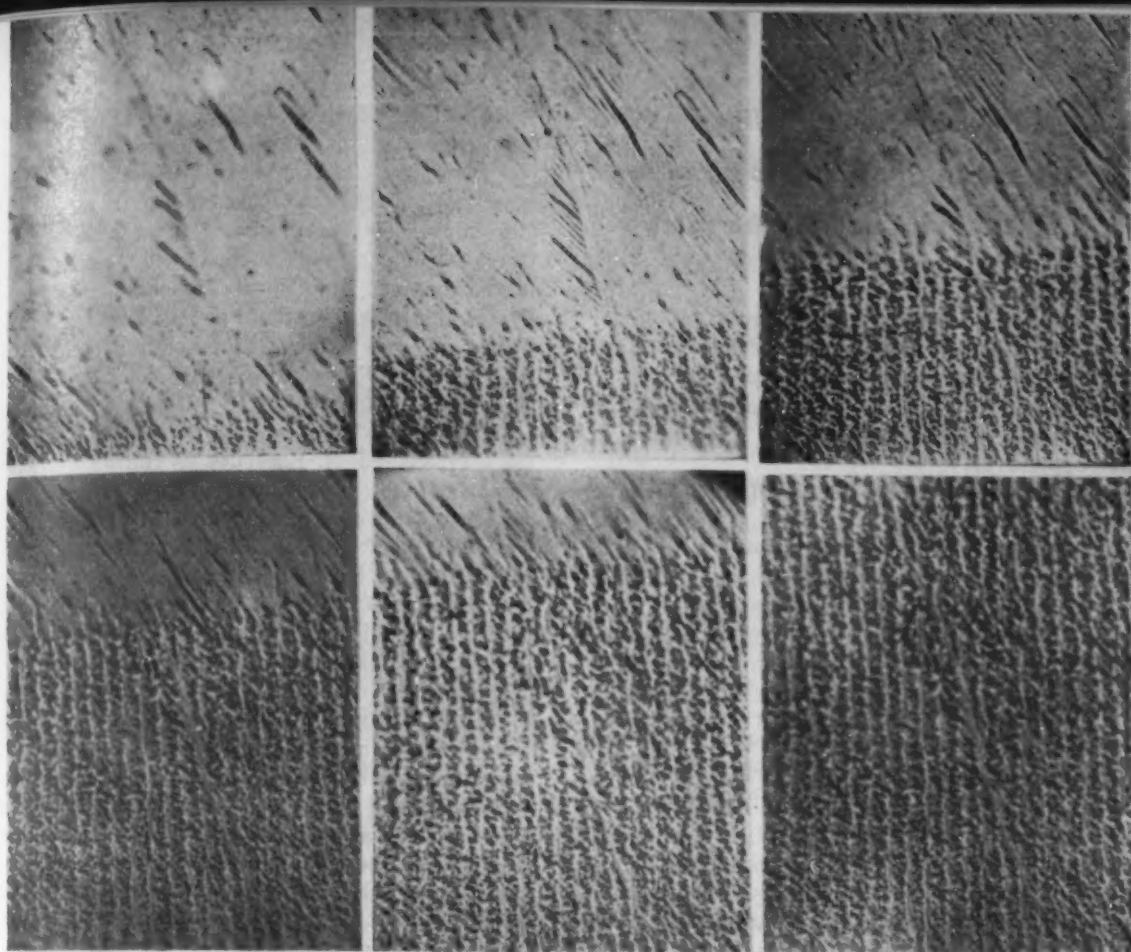
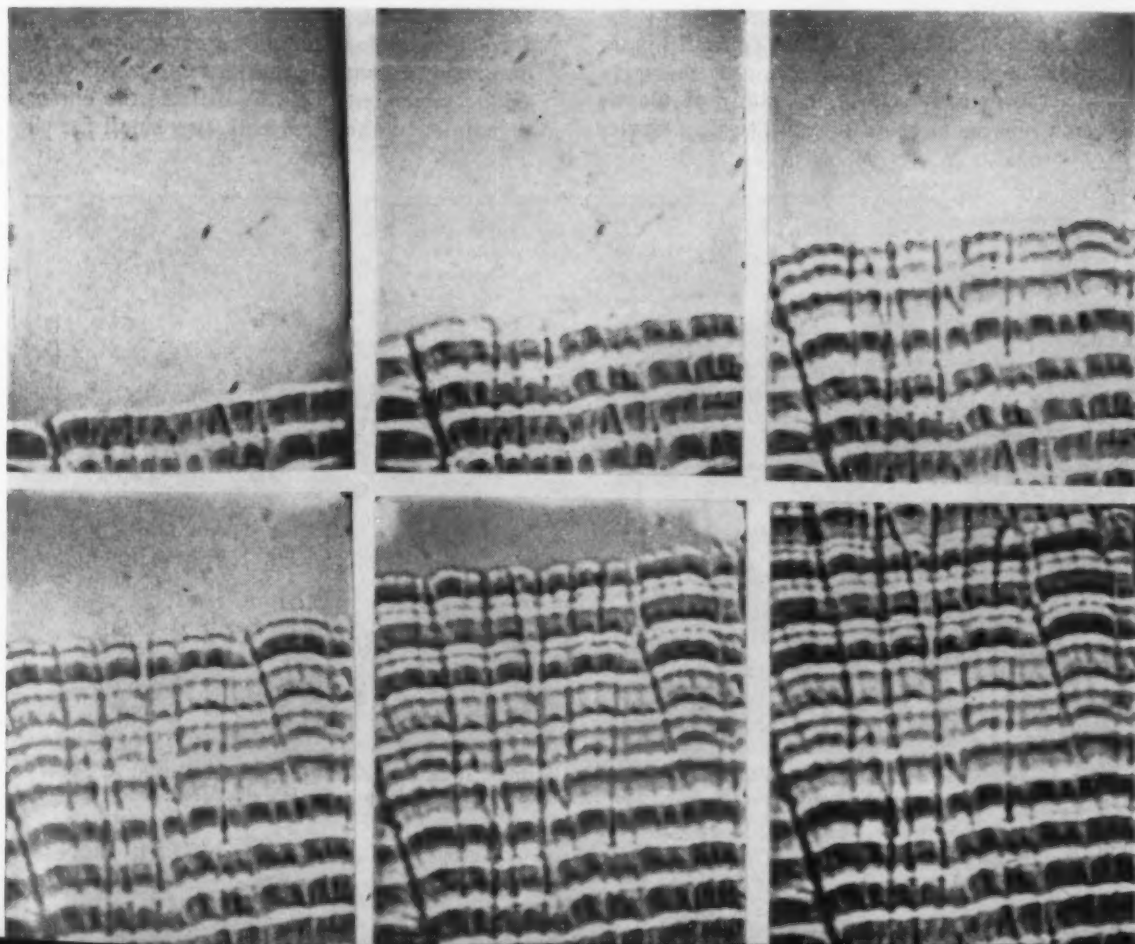


FIG. 1—Progressive solidification of pure tin, showing advance of solid-liquid interface from bottom to top in each frame. Pictures, taken at 32 frames per sec, show growth of minute channels or line striae.

FIG. 2—Progressive solidification of lead-tin eutectic, showing the advance of the solid-liquid interface, bottom to top in each frame. Taken at 48 frames per sec, pictures show transverse shrinkage marks caused by vibration in mold.



"Movement of the liquid solid interface . . . pictures an idea of the solidification mechanism . . ."

first type of movement are presented in Figs. 1 and 2. Fig. 1 shows the growth of minute channels in pure tin as the metal transforms from liquid to solid. The liquid-solid interface is the termination of the channels or line striae in these pictures.

Seen from the ends, these channels in the liquid-solid interface resemble a network of almost hexagonal figures, each with a rounded protrusion from the interface into the liquid. By watching the movement of the liquid solid interface upon solidification in each of these motion pictures an idea of the solidification mechanism, on a microscopic scale, as well as a quantitative measure of the solidification rate may be obtained.

When solid solution alloys are solidified both the liquidus interface and the solidus interface can be seen to traverse the field. Fig. 2 shows the formation of the channels, or line striae, in the lead-tin eutectic as it transforms from a liquid to a solid. This is not the eutectic structure. The transverse bands are shrinkage marks caused by vibration in the mold holding the molten metal and are similar to waves solidified. The longitudinal bands are not continuous as in tin, but start from a point, proceed to a maximum width, then taper to a point again. Considerable information concerning eutectics and eutectic solidification could be gained by studying this origin point of the striae form at higher magnification.

To perform a motion-micro study of plastic deformation on metal a special testing device

was needed. The machine, capable of deforming the material, must also be able to measure the load applied and the extent of strain in the specimen. Problems connected with mounting the microscope, maintaining focus, and the effects of vibration on recording definition indicated the need for a special machine.

The micro-tensile machine members were constructed from cold-rolled steel and consist of three parts, as shown in Fig. 3. The chassis, 4 x 4 x $\frac{3}{4}$ in., is equipped with an oil cylinder, A, and piston, the piston being part of the movable crosshead, B. Pressure in the oil cylinder is controlled and regulated by an external pneumatic-hydraulic cell, C, which is connected to the cylinder by a $\frac{1}{8}$ -in. high-pressure copper tube. This cell is half filled with hydraulic oil and has a needle valve, D, on the oil exit side as well as a needle valve, E, on the gas inlet side. A quick-acting valve, F, as well as a pressure gage is provided for the gas side.

The oil exits into the load position on the micro-tensile machine. By connecting a tank of inert gas to the gas inlet, regulated pressures were provided over the oil so that the oil would leave the cell at a rate determined by the setting of the exit needle valve, the gas pressure and the pressure of the oil in the load piston of the micro-tensile machine. With this pneumatic-hydraulic arrangement it was possible to control, within small limits, the strain rate of the specimen being tested.

Shoulder-type grips of hardened tool steel were attached to the movable cross-head as well as to the chassis through a centerless ball bearing race. These centerless bearings, capable of withstanding a thrust pressure of 970 lb. afforded axial loading on the specimen without danger of damaging this micro-gimbal.

The micro-load cell, G, utilizes the clip gage principle. In this load cell, two small flat ellip-

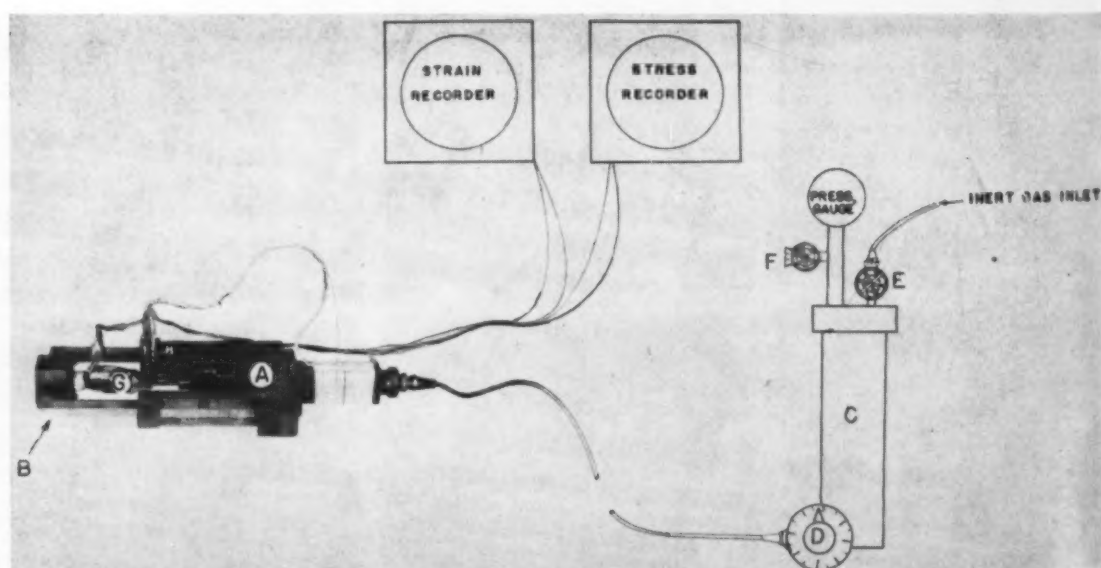


FIG. 3—Schematic arrangement of micro-tensile machine with strain, stress recorders, gas-hydraulic system: A, cylinder; B, crosshead; C, pneumatic-hydraulic cell; D, E, and F, valves; G, micro-load cell; H, clip gage.

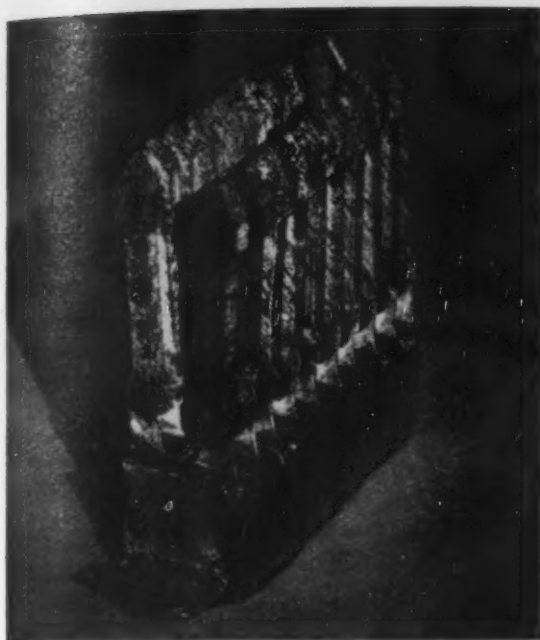


FIG. 4—Gang casting of aluminum single crystals.

tical springs were welded together at either end and provided with a shoulder grip at each end. SR-4 Type A-1 strain gages were attached to the inner surface of one spring and the outer surface of the mating spring. This arrangement offered the smallest change in deflection due to an eccentrically placed load. A Foxboro Dynalog recorder was used to establish a continuous load-time record after the micro-load cell had been statically calibrated.

Best results obtained for recording strain were achieved using a micro-clip gage, H, made in the form of a $\frac{3}{4}$ -in. circle segment from thin phosphor-bronze strip. This strip was wide enough to allow permanent attachment of a Type A-1 SR-4 strain gage on both sides. Ends

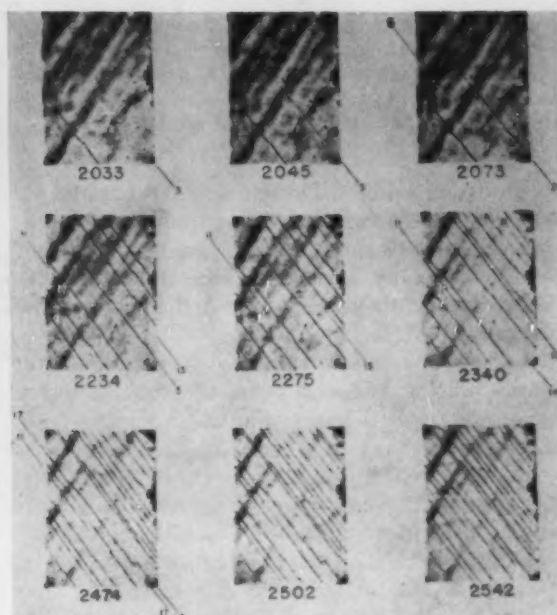


FIG. 6—Progressive formation of slip lines during plastic deformation of an aluminum single crystal as seen in successive frames taken at 32 frames per sec.

of the strip were narrowed, pointed and turned outward from the circle.

The clip gage was attached to the specimen by two cotton strings impregnated with Duco cement and tied around the specimen at $\frac{1}{2}$ -in. intervals. When set and dried, the strings became holding blocks for the points of the clip strain gage. When the clip gage was compressed and its points set between these strings it was held from expanding until the specimen was elongated. By measuring this expansion, elongation of the specimen was measured. The clip gage was calibrated in absolute units so the gage length could be precisely determined.

The phosphor-bronze strip was made exceed-

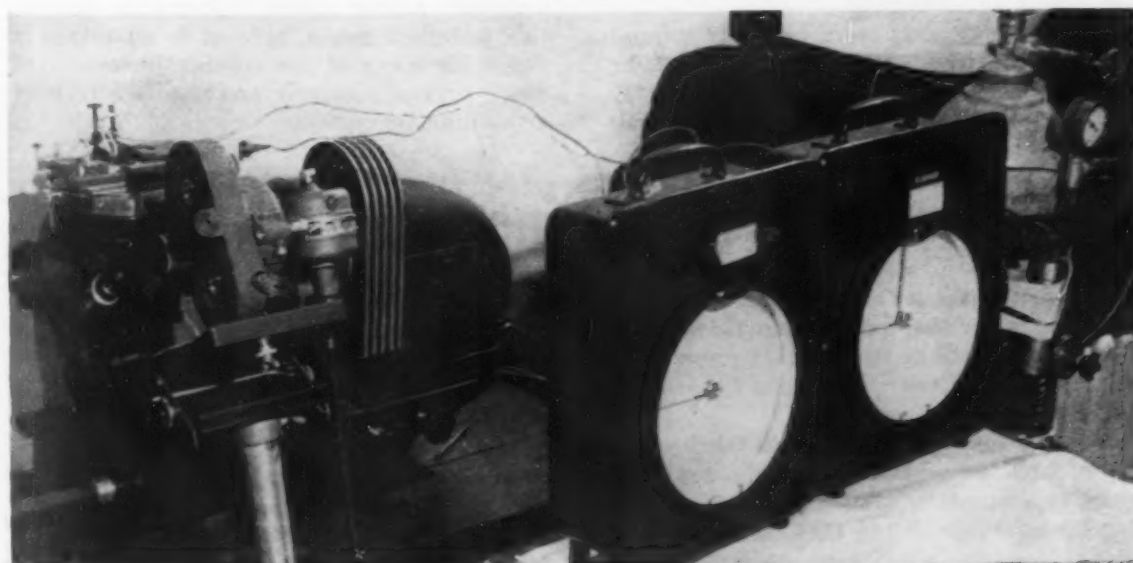


FIG. 5—General arrangement of apparatus used for motion-micro studies of plastic deformation.

"It was possible to correlate stress and strain (in single crystals) . . . with the slip lines . . ."

ingly thin in order that the force exerted by the gage would be a very small fraction of the force required to deform the specimen or move the string blocks. It was possible with this clip gage and a gage length of about $\frac{1}{2}$ in. to measure pct elongation to a value of 0.05.

The machine also has wedge type grips for testing plate specimens. Some of the first tests performed with this machine were on the polished and etched surfaces of carbon-molybdenum steel weld segments. These contained graphite continuum which had developed because of the effect of the high-holding temperature and pressure on the particular material.

Object of the tests was to determine how the fracture moved through the continuum. Tests were also conducted on steel specimens galvanized by several different methods. Specimens were polished and etched to expose the zinc-iron interface and interphases. Object of the experiment was to determine which type of coating failed first, and to observe the order and character of failure in the interphases. An investigation of plastic deformation of aluminum and aluminum single crystals was undertaken.

Single crystal specimens of 99.997 pct purity aluminum $\frac{1}{8}$ -in. square and $1\frac{3}{8}$ -in. long were made by gradual solidification from the liquid state. Since no machining work could be introduced in preparation of small crystals, molds consisting of two separate high purity graphite blocks were designed for casting the crystals to final shape. Each block was cut from a properly milled graphite plate. Twenty molds were generally packed in one container so that 20 specimens could be obtained at one casting. Fig. 4. By this method groups of crystals with similar orientations were obtained.

The as-cast crystals were carefully clipped from the gate, etched and homogenized for 24 hr at 600°. They were then polished, using a 4/0 paper, re-etched and finally electrolytically pol-

ished. Crystallographic orientation of each specimen was determined using a back-reflection, Laue method. String blocks were attached, and the specimen placed in the micro-tensile machine on the microscope, and the test was ready to be run.

Since quantitative data was desired from these tests it was again necessary to take a motion picture record of surface changes.

The setup for taking the moving picture was similar to that described for the liquid-solid transformation studies. An inverted stage microscope was used. This arrangement can be seen in Fig. 5.

In the qualitative surveys made in the plastic deformation and cleavage of metals it was not too important to maintain the exact same field in view. However, in the quantitative study it became important to keep the same field, since it was desirable to measure such phenomenon as the rate of propagation of a slip line. To accomplish this it was necessary to pace both the movement of the specimen away from the objective lens, and the lateral movement of the chosen field. This lateral movement was due to elongation of the specimen.

As a result of these studies on single crystals it was possible to correlate stress and strain with the appearance and propagation of each slip line. It was also possible to measure the sequence of appearance of the slip lines as well as the direction of their development.

Only with certain orientations of the crystals could propagation of slip lines be noted. Fig. 6 illustrates the appearance and propagation of a number of slip lines in a single aluminum crystal. Lines were numbered to identify them from frame to frame.

The micro-tensile machine has been used for normal tensile testing to determine strength values of polycrystalline specimens available only in small sizes.

Preliminary motion micro studies of the grain boundary during plastic deformation indicate this technique might be used to advantage in supplying many of the missing links between single crystal plasticity and plasticity of polycrystalline aggregates.

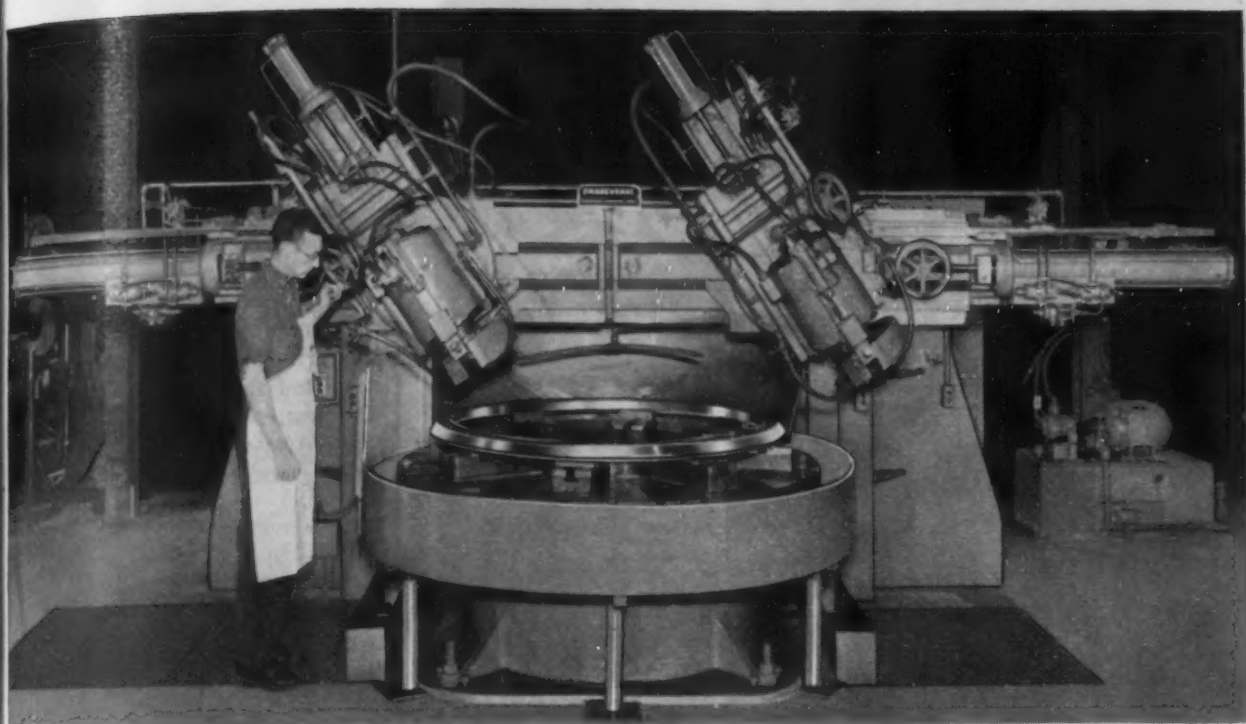
Formula cuts metal testing time

Better metals for jet engines, guided missiles and atomic power plants may result from use of a formula developed by two brilliant young engineers at General Electric's Thomson Laboratory, Lynn, Mass.

The stress formula, which speeds the development of high temperature materials, has been applied to a calculator which works like a slide rule. Up to a year of test time can be avoided with the formula, which relates strength with time and temperature. The formula was devised

by James Miller and Frank R. Larson.

With data obtained on short time acceptance tests and the calculator, long time strength of metals under high temperature may be determined. Capacity of creep and rupture equipment may be increased. Data on intermediate temperatures may be obtained without cross plotting. Complete rupture characteristics of an alloy may be represented by a single curve, facilitating comparison with other materials, it is claimed.



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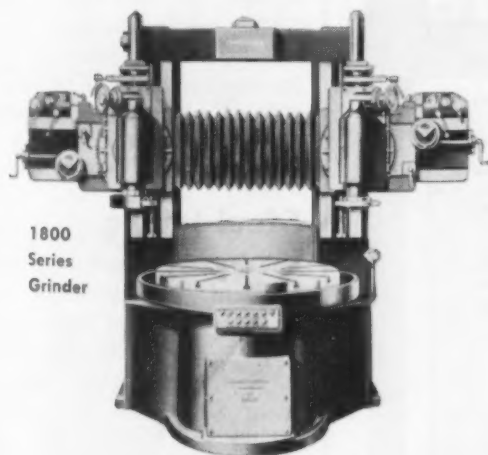
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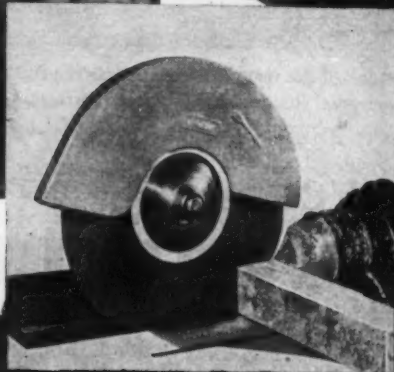
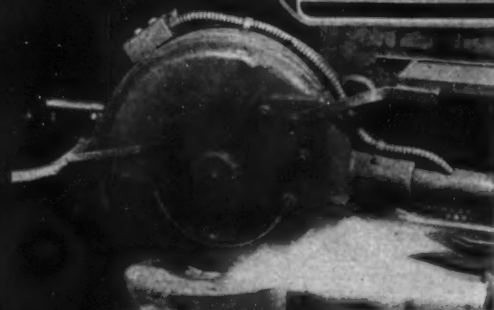
★ GRIND OUTSIDE • INSIDE • and FACES SIMULTANEOUSLY ★

Specific Purpose Grinding Wheels

Today, no general purpose wheel, whether for snagging, cutting off or finishing, can possibly perform with competitive economy and efficiency. From plant to plant, variations in nature of metals, wheel speeds, ways of working and objectives in each progressive step, are too great. Most plants gain three ways with Electro Specific Purpose Grinding Wheels. If you will write, wire or phone us, we will, without cost or obligation to you, send a technically trained Sales Engineer to show you how you can do it, too.



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Free Publications

Continued

Deaeration heaters

Corrosion and pitting of boilers caused by non-condensable gases such as oxygen and carbon dioxide can be eliminated by Graver feed-water deaerating heaters outlined in a new bulletin. An introductory section of the publication explains the principles of successful deaeration and the essential elements of the heaters. Both tray-type and spray-tray-type heaters are covered. *Graver Water Conditioning Co.*

For free copy circle No. 13 on postcard, p. 131.

Using air

In a new 60-p. catalog on air conditioning, cleaning and handling, extensive coverage is given to the problem of putting air to work. The catalog is divided into three sections: One on equipment, one on application and the other on engineering data. Also included is a chart which cross-indexes equipment performance and job requirements to ease selection of the right piece of equipment for specific jobs. *Westinghouse Electric Co.*

For free copy circle No. 14 on postcard, p. 131.

Hobbing

Of particular interest in the new 12-p. bulletin describing Michigan Ultra Speed Gear Hobbing Machine, model 1458-A, is a photographic sequence showing how the machine accurately hobs the teeth on two 3 1/8 in. diam helical gears in only 58 sec. Included in the folder are explanations of design and operating principles, tooling layouts for hydraulic clamping and general machine specifications. *Michigan Tool Co.*

For free copy circle No. 15 on postcard, p. 131.

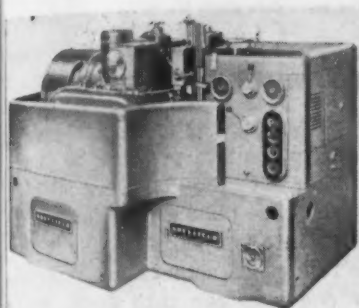
Steel tubing

Fabrication of welded steel tubing is discussed in detail in a new 28-p. manual published by Armco Steel Corp. Stress is laid on "how to do it" and "what to do it with." Covering all phases of welded steel tubing fabrication, the booklet is useful as a reference source for both experienced and inexperienced fabricators. *Armco Steel Corp.*

For free copy circle No. 16 on postcard, p. 131.

NEW equipment

New and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard on page 131 or 132.

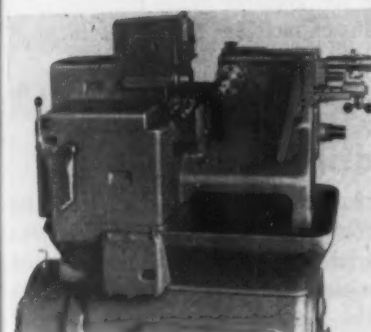


Gears produced faster, have uniform accuracy

The grinding method employed on a new high precision gear grinder is said to produce gears at a faster rate and with more constant uniform accuracy than heretofore in mass production. Periphery of the wheel is formed with a helical rib by a combination of Crushtrue and diamond dressing. Gear blank

rotates continuously at a set rate in direct relationship to grinding wheel into which it is fed in an upward direction during the grinding operation. Without stopping the grinding wheel, work can be removed for inspection and when replaced is automatically properly located. *Sheffield Corp.*

For more data circle No. 17 on postcard, p. 131.

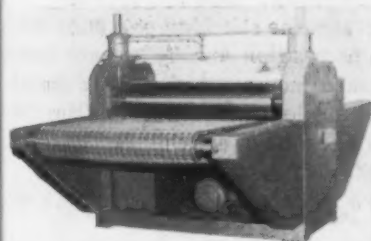


Screw machine has changeable cam assemblies

Interchangeable cam assembly units that can be pre-selected and assembled for the next job, while one job is still being run, substantially reduce setup and downtime on the German-built BMW single spindle automatic screw machine. The assembly unit includes cams for longitudinal feed of the turret, front and rear cross slides, turret index,

collet actuation and stock feeding, and also, as standard equipment, trip dogs to change rotation of the work spindle. Cams and trip dogs are positively locked in place to assure exact size control and accurate timing. It provides speeds up to 5800 rpm and handles bar stock up to $\frac{7}{8}$ in. with turning length of $1\frac{3}{4}$ in. *Kurt Orban Co., Inc.*

For more data circle No. 18 on postcard, p. 131.

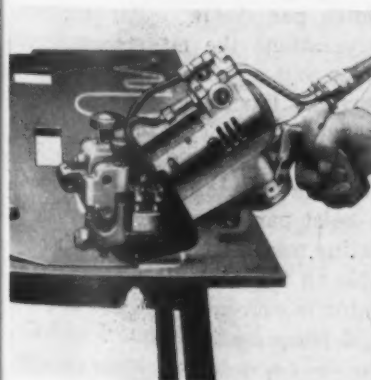


Roller coater has high functional efficiency

A new roller coater is designed to meet approximately 95 pct of all types of compound spreading requirements. It is equipped with three sets of rolls and with automatic infeed and off-bearing conveyers. Rubber nip rolls convey the workpiece from infeed conveyor

through a set of brush rolls for cleaning and then through a set of hardened steel coating rolls. Doctor rolls, controlled by calibrated handwheel with micrometer adjustment, gage thickness of the compound coating. *Union Tool Corp.*

For more data circle No. 19 on postcard, p. 131.



Hand tool cuts plate from $\frac{5}{64}$ to $2\frac{1}{4}$ in.

The Cadet, a portable, hand operated flame cutting machine weighs 19 lb, will do plate cutting from $\frac{5}{64}$ to $2\frac{1}{4}$ in. It is an oxyacetylene flame cutter that will do straight cutting, I-beam cutting, circle cutting to a radius of 1 in., and bevel cutting. Torch can be set at any angle for bevel cutting. Graduations in 5° increments are inscribed in the torch holder body.

It is powered by a self-contained electrically driven motor. A table, attached to the machine, gives proper selection of cutting speed, oxygen pressure and torch tips—even correct distance between tips and work surface. The torch is adjustable vertically and horizontally. *American Pullmax Co., Inc.*

For more data circle No. 20 on postcard, p. 131.

Turn Page

New Equipment

Continued

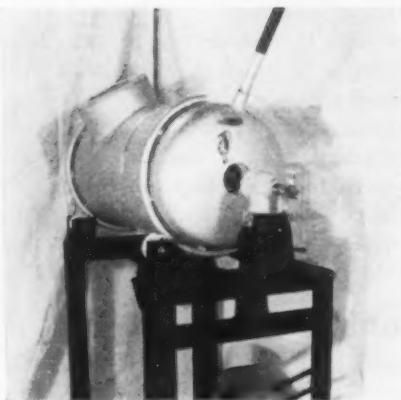


Heat treating furnace has wide firing range

Equipped with Globar elements and designed for continuous duty, the FG-76 heat-treating furnace performs efficiently at all heat levels up to 2500°F, with even higher temperatures available for short or intermittent runs. Case construction is heavy, gas-tight, electrically welded steel. Element parts are suitably gasketed and tightened by means of thumb screws. The

manually operated door, which is also available for air operation, assures a complete brick-to-brick, over-lapping, wedge fit against all sides of the furnace opening. Gas curtain attachment and valve are provided as standard equipment. Power requirements for the furnace are 15 kw at 220 v, 3 phase, 60 cycle. *Pereny Equipment Co.*

For more data circle No. 21 on postcard, p. 131.



Brass furnaces for large and small shops

Starting cold, the brass furnace illustrated will bring 250 lb of brass to pouring temperature in 40 min. A ventilated cover is provided so the metal may be held indefinitely; burner may be kept on low heat. Two types of burners are available: one uses high pressure air and the other, blower air. Fuel may be any gas or oil. Where crude bunker oil is used, it must be heated to about 180°F. Oil fuel

pressure may be from 4 ft gravity feed to positive pressure by pump. Lining of the furnace is high quality fire plastic. The furnace divides into two parts making it easy to reline. On actual tests, reportedly one man can take down, reline and assemble the 250-lb furnace in 5 hr. Similar brass furnaces range in capacities from 250 lb to 35 tons. *W. C. Cheney Mfg. Co.*

For more data circle No. 22 on postcard, p. 131.

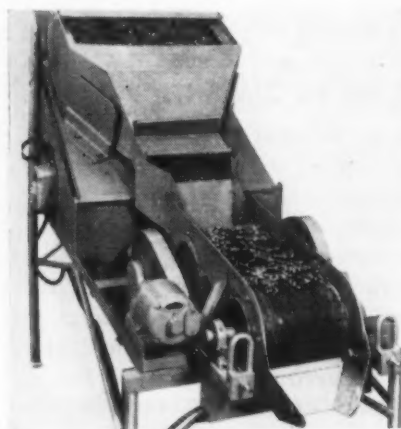


Wire stitcher features rotating head

The 13-in. throat combination bottom and straight arm wire stitcher is one of 20 models that can be made up by interchanging certain attachments. Steel tube construction used where the stapling head is fastened makes it possible to increase the throat size from 13 in. minimum to 20, 30, 36 in. Using the steel tube idea in the main column permits raising or lowering the stitching height. A universal joint incorporated in the main column allows the machine to be

placed on its side, back or to tilt forward. Stitching head rotates within a circle by simply loosening a screw. Solenoid control makes the machine versatile and flexible. Universal joint is used only on special order. One trip foot pedal operates the stitching post into stitching position and by a slight downward movement an electric contact is made which in turn trips the solenoid clutch. *Brehm Wire Stitcher Mfg. Co.*

For more data circle No. 23 on postcard, p. 131.



Combination mechanical-magnetic separator

Separating parts from Roto-Finish abrasive chips where both ferrous and nonferrous parts are processed by Roto-Finish methods is accomplished with a combination mechanical-magnetic separator. In mechanical separations the mixed mass passes over a motor driven, agitated separator screen. Separation is made as the oversize parts are discharged from the top of the screen; processing chips go through the screen and discharge into a

hoist pan below. For magnetic separations the magnetic separating unit replaces the agitated screen. Parts and chips pass over a magnetic pulley. Parts are separated magnetically and then conveyed to a container; chips fall into a hoist pan below. The two separating mechanisms are interchangeable on the portable frame. Separator is driven by 1/3 hp, 220/440 v, 3 phase motor. *Roto Finish Co.*

For more data circle No. 24 on postcard, p. 131.

Optical flats

Two new optical flats, one 10-in. diam for checking the flatness, size and parallelism of large pieces, the other 1-in. diam for checking tiny surfaces, are manufactured of pure, fused Brazilian quartz, selected for clarity and having minimum thermal expansion. Edges are smoothly ground and beveled and the sides are wrapped in a black band. Each flat is marked with the exact accuracy in millionths of an inch and this accuracy is maintained the full width of the flat. *DoAll Co.*

For more data circle No. 25 on postcard, p. 131.

Alarm-silencing relay

A new relay provides a method for shutting down the alarm of a control system, while insuring automatic reset when the alarm condition is corrected. Red pilot light on the relay warns until the alarm circuit has been cleared. *Minneapolis-Honeywell Regulator Co.*

For more data circle No. 26 on postcard, p. 131.

Gas torch

Pistol-shaped Torch-O-Matic lights at squeeze of trigger and shuts off upon release. It is a versatile, handy tool for on-again, off-again jobs such as soldering, brazing, loosening frozen nuts and bolts, setting anchor bolts, removing shrink-fit collars and bushings, etc. Torch-O-Matic weighs 12 oz. *Velocity Power Tool Co.*

For more data circle No. 27 on postcard, p. 131.

Quick wheel reversal

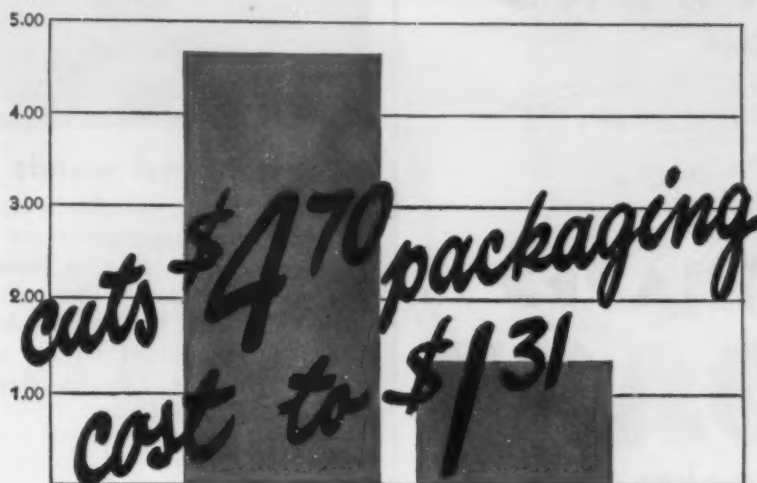
A reversible wheel adapter mounted on a standard periphery-type diamond wheel permits the wheel, when it wears on one edge, to be reversed on the spindle without the delay and expense of retruing the wheel. The adapter stays mounted on the wheel at all times. On any formed or angular periphery type surface grinder wheel, it permits quick and accurate wheel reversal for grinding left and right handed tools or parts. The adapter is designed for No. 2 B&S and similar machines having a 1-in. spindle with 3 in./ft. taper. *Detroit Milling Cutter Co.*

For more data circle No. 28 on postcard, p. 131.

Turn Page

Angier

Vapor from paper STOPS RUST of diesel locomotive parts



A leading locomotive firm used to dip diesel cylinder heads in an inflammable cleansing liquid. Then moisture had to be removed. This called for cranes and fire precautions. Dried with an air hose, heads were dipped into a varnish-like solution. To keep the sticky coating in place, waxed paper and heavy wooden boxes were "musts". Unpacking involved the same troubles in reverse. A couple of hours with a scrubbing brush came before the heads could be installed.

Today, vapor from paper stops rust. It is Angier VPI* Wrap. It gives off an invisible protective vapor that is clean... SAFE. As the vapor permeates into deepest cavities, both air and moisture are

made harmless to shiny cylinder heads. No grease or oil is necessary. Now packaging costs are down to \$1.31 from \$4.70. And this doesn't include an average freight savings of 24% on the thousands of different locomotive parts that now are VPI-protected. All parts are ready to use when received... a godsend to men in the repair shops. No bulky equipment is required, so valuable floor space is saved.

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New Equipment

Continued



Hydraulic test stands

Compact, low cost, portable hydraulic test stands supply pressures to 10,000 psi. Units may be pushed by hand or towed. Illustration shows units built for Douglas Aircraft Co. for guided missile assembly line tests. *Haskel Engineering & Supply Co.*

For more data circle No. 29 on postcard, p. 131.

Screw pump

Internal gear and bearing type screw pump for positive displacement of lubricating fluids or semi-fluids has capacity range from 1 to 700 gpm and discharge pressures of 1000 psi for viscous liquids, 500 psi for light oils. Special points of interest are heavy duty roller bearings just inboard of the timing gears where radial load is heaviest, lock nuts behind the timing gears for faster, simpler repairing, and double row angular contact ball bearings at the rear end which position rotors axially for less wear on the bearings and timing gears. *Sier-Bath Gear & Pump Co., Inc.*

For more data circle No. 30 on postcard, p. 131.

Electric oven

For high temperature processing, a new portable electric oven is equipped with Inconel sheathed sealed tubular heating element for greater heating efficiency. It features a thermostat control with temperature range of 300° to 1000°F and a stainless steel interior. Two or more ovens can be used in a group or bank as they are constructed to nest one on the other. Construction is heavy gage steel with minimum of 4 in. fiberglass insulation. Inside dimensions 22 x 18 x 16 in. high. *Grieve-Hendry Co., Inc.*

For more data circle No. 31 on postcard, p. 131.

Greater Tonnage
Per Edge of Blade

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SHEAR KNIFE CO.**
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High velocity turning

A West Coast machine shop is said to obtain excellent finish, high production rate, and extended tool life on turning centrifugal cast stainless steel rings at 900 sfm with standard Kennamatic triangular inserts. The operation is done on an American HDL 16 lathe having hydraulic profile attachment using two Style TB12 triangular inserts—Grade K2S for semi-finishing and Grade K6 for finishing. *Kennametal, Inc.*

For more data circle No. 32 on postcard, p. 131.

Superaccurate center

An anti-friction, superaccurate Red-E center features an increased head size that permits the use of larger bearings for greater radial and thrust load capacities. Bearings are preloaded anti-friction ball bearings in a single row. Duplex arrangement in the head and a self-aligning precision roller bearing in the shank. Labyrinth is so made that no cutting oil or chips can enter, neither can the self-enclosed lubrication escape. Center is alloy steel construction with heat treated spindle. Accuracy is guaranteed. *Ready Tool Co.*

For more data circle No. 33 on postcard, p. 131.

Thinnest grinding wheel

The thinnest Norton grinding wheel and one of the smallest made is this 3½ in. diam rubber bonded wheel used to slit the nibs of pen points. The wheel is 0.006 in. thick. Abrasive used is regular Alundum, the grit size, 240. *Norton Co.*

For more data circle No. 34 on postcard, p. 131.



Turn Page

for BLUE
Rust-Resisting
Castings

One hundred tons of blue gray-iron castings like the one above are produced every 24 hours in a mid-western foundry's Holcroft furnace. The casting has eye appeal and resists rust.

When foundries and other metal-working plants have unusual furnace requirements they consult a Holcroft engineer. That's because Holcroft has literally blazed the heat-treating trail and is recognized as the industry leader. Holcroft is constantly working on new ways of heat treating metal in both custom- and standard-built furnaces.

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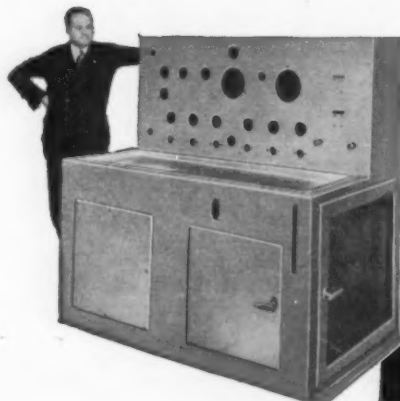
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METAL FABRICATION



New Equipment

Continued

Universal joint

New heavy-duty universal joint with a 6-in. hub diam measures 15½ in. long (single joint), 25 in. (double joint). Weight of single joint is 98 lb, double joint 155 lb. Forks are cast of alloy steel, pins and blocks of cold drawn alloy



steel. All parts are heat treated and ground for maximum strength and durability; hubs are machined to purchasers' specifications. Assembly and disassembly are made easy through use of threaded small pin and lock nut. Spare parts available at all times. *Curtis Universal Joint Co.*

For more data circle No. 35 on postcard, p. 131.

Chrome carbide kit

Sample test kit containing a variety of shapes and sizes of the new Grade 608 cemented chrome carbide is available. It has been assembled to enable product designers, engineers and metallurgists to make metallurgical, physical, and chemical tests to check corrosion, abrasion and erosion resistance of the carbide in specific applications. *Carbology, Dept. of General Electric Co.*

For more data circle No. 36 on postcard, p. 131.

Bushing extractor

Seventy-five per cent saving in labor time in extracting bushings, bearings, sleeves, etc., is claimed for a new bushing and bearing extractor. The tool eliminates the necessity of machining bearings, minimizes the hazard of injuring casings, and excessive dismantling of equipment. The extractor consists of eight threaded expanding arbors, a draw table with two sets of legs, short and long, adjustable for distance from work. It can handle holes from ½ to 2 in. diam. *Crozier Machine Tool Co.*

For more data circle No. 37 on postcard, p. 131.

Booster gun

An automatic high pressure booster gun is designed to lubricate bearings on industrial machinery requiring injection of a small quantity of lubricant at extremely high pressure. Gun provides complete range of pressures up to 10,000 psi. Easy one-hand push action eliminates fatigue; gun weighs 2 lb. Long, hydraulic coupler extension permits reaching deep-seated and hard-to-reach fittings. *Lincoln Engineering Co.*

For more data circle No. 38 on postcard, p. 131.

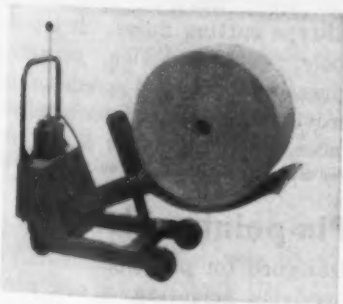
Stack valve

New $\frac{3}{4}$ in. multiple section stack valve is designed for series operation, permitting any number of devices to be actuated simultaneously under full or varying load, provided the total load does not exceed the relief valve setting. As each section is an individual, standard unit, a valve assembly or stack may be tailored to exact requirements with various inlet, four-way, three-way and outlet sections. O-ring seals between sections assure leak-proof construction. *Sundstrand Machine Tool Co.*

For more data circle No. 39 on postcard, p. 131.

Hydraulic lifter

Raising and lowering heavy rolls in restricted areas is possible with a new hydraulic lifter. It will load and unload rolls of 1000 lb from presses, and other roll fed machinery. Lifter is custom built to individual requirements. Can be fur-



nished with trunnions for handling rolls with shaft or spindle or with a scoop for handling cylindrical objects. *Service Caster & Truck Corp.*

For more data circle No. 40 on postcard, p. 131.

Turn Page

The driven gear shown here is
5" in pitch diameter and
15" long overall.

It is carburized and hardened
with heat-treating distortion
held within .001".



Young Men of Vision

• Their business is precision! At boards today. Master craftsmen, fine Indiana Gear, success or failure is equipment, skilled sub-contractors based on vision... today's gear problems were solved yesterday and tomorrow's "tough cogs" are on the competitive business.

INDIANA GEAR



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August 7, 1952



THERE'S plenty of experience behind the airline pilot, whose responsibilities demand special training and knowledge.

You'll find an equally important background of experience behind the production of metal stampings at Worcester Stamped Metal — where responsibility to industry demands the manufacture of component parts, based on advanced technical knowledge and the most accurate methods.

Perhaps you need stamped parts for a new product — or have a problem in re-design! Worcester Stamped Metal engineers are specialists in the planning and scheduled production of light, heavy and deep drawn stampings from steel, stainless steel, aluminum—and other metals and alloys . . . on long or short run requirements.

Competent supervision, modern equipment and trained personnel assures high quality stampings and "on time" deliveries. Send samples and blueprints for quotations.



WORCESTER STAMPED METAL
Company

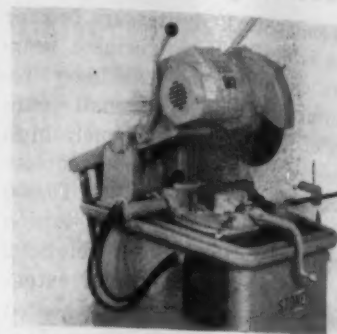
10 HUNT ST., WORCESTER, MASS., U. S. A.



SPECIALISTS IN SKILLED STAMPING SERVICE

New Equipment

Continued



Cut-off machine

The Stone M75 cut-off machine is for heavy, continuous production cutting of all ferrous and nonferrous metals. Cutting head power has been increased to 7½ hp. A work stop and air activated vise are available at extra cost to facilitate increased production. *Stone Machinery Co.*

For more data circle No. 41 on postcard, p. 131.

Bronze needle valve

New Gland-type bronze needle valve is small and compact, making it suitable for pin-point control on small lines where fine regulation of flow is essential. It is manufactured in full range of sizes from ⅛ to 1 in. and in both glove and angle patterns. *Lunkensheimer Co.*

For more data circle No. 42 on postcard, p. 131.

Wax-type cutting oil

Improved metal cutting action and marked reduction in tool wear are claimed for a wax-type cutting oil called Wax-Cut. It is for use in automatic screw machines, gear cutting machines, broaches, lathes, and other machine tools that use oil-type cutting fluids. It provides cooler cutting action, permitting increased feeds and speeds and improving the finish of machined surfaces. *S. C. Johnson & Son, Inc.*

For more data circle No. 43 on postcard, p. 131.

Pin-point soldering

Designed for pin-point accuracy on precision soldering, a new soldering iron weighs 3 oz, has ⅛ in. diam tip and is rated at 25 watts. Elements, tips and other parts can be readily replaced. Furnished for 110 or 220 v dc or ac. *Hexacon Electric Co.*

For more data circle No. 44 on postcard, p. 131.

Technical Briefs

Blast Cutting:

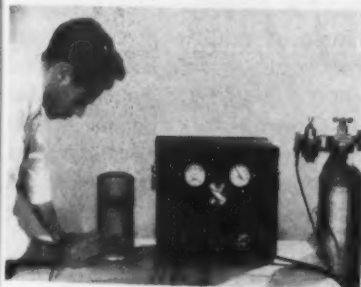
High velocity, gas propelled abrasives cut hard materials.

Cutting by means of a high-velocity stream of gas-propelled abrasive particles provides a fast accurate method for controlled removal of hard-to-work materials.

Controlled cutting of metallized films on glass and ceramics, drilling of thin sections, etching, deburring and other similar operations may be accomplished with the Airbrasive Unit developed by S. S. White Dental Mfg. Co. of New York.

Carbide Nozzle — In operation, the unit directs a gas-propelled abrasive stream against the work surface through a tungsten carbide nozzle. As it leaves the nozzle the stream travels at approximately 1100 fps and is 0.018 in. in dia.

Cutting action is accomplished without the usual increase in temperature and without the pressure and vibration ordinarily experienced with other cutting methods, especially helpful on germanium, whose physical or electrical prop-



HARD, BRITTLE materials are easily cut with gas-propelled, high-velocity abrasive cutting unit. Here block is being etched from template.

erties might be affected by heat and shock.

No Direct Contact—Lack of direct contact of a tool with the work eliminates dimensional variations due to wear of the cutting tool or surface irregularities in the work.

Despite the ease with which it cuts hard and brittle surfaces, the process has little effect on resilient or soft materials,

Turn Page

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Water hardening steels with controlled hardenability for every water hardening tool steel need. For service, for quality, look to Columbia — producers of fine tool steel by the electric process.

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"Certified" Samson Shot and Angular Grit are made extra-tough by a special automatically controlled hardening process. They wear longer, can be used over and over again . . . actually clean more castings per dollar! Save money . . . switch to "Certified" Abrasives.

Experienced Foundrymen say:

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PITTSBURGH CRUSHED STEEL CO., Pittsburgh, Pa.
STEEL SHOT AND GRIT CO., Boston, Mass.



Technical Briefs

Corrosion:

Porcelain enamel coating extends life of processing equipment.

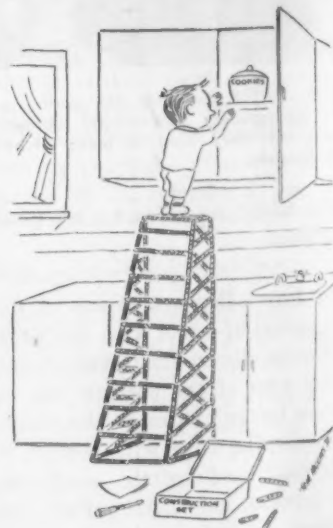
Rapid corrosion of ferrous metals, from which much processing equipment is made, has long been a problem in production of aluminum. Solution to this problem was recently found by Reynolds Metals Co. in wider use of porcelain enamel on pipe and tubing subject to corrosive attack.

One of the worst offenders, cost-wise, has been the black iron pipe used for conveying chlorine gas beneath the surface of the molten aluminum in a fluxing and degassing operation.

Eaten Away—In addition to the corrosive effect of the molten bath, the pipes were rapidly "eaten away" by the chlorine gas, which becomes highly corrosive at elevated temperatures.

Average service life for the black iron pipes was 7 to 8 min, with 10 min an absolute maximum.

Suggested Materials—Materials of greater corrosion resistance than black iron pipe—carbon, graphite, ceramic, quartz and grey cast iron—were rejected either because of additional cost, or such factors as mechanical and thermal shock. Porcelain enamel coating of the pipe was suggested for its high service life, 100 min, in a 1250° to 1350°F bath.



Turn Page

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MUNDT

PERFORATED METALS

The few perforations illustrated are indicative of the wide variety of our line—we can perforate almost any size perforation in any kind of metal or material required. Send us your specifications.

Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure satisfaction.

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IF BLOWER FAILS



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The Dewey Safety Air-flow Switch protects against opening of fuel valve until fan is up to speed.

Insures purging of furnace before fuel valve opens. Closes fuel valve if fan slows up or stops. Flashes danger signal if fan or fuel stops. Safeguards against danger from gas fuel failure when used in connection with safety shut-off valve.

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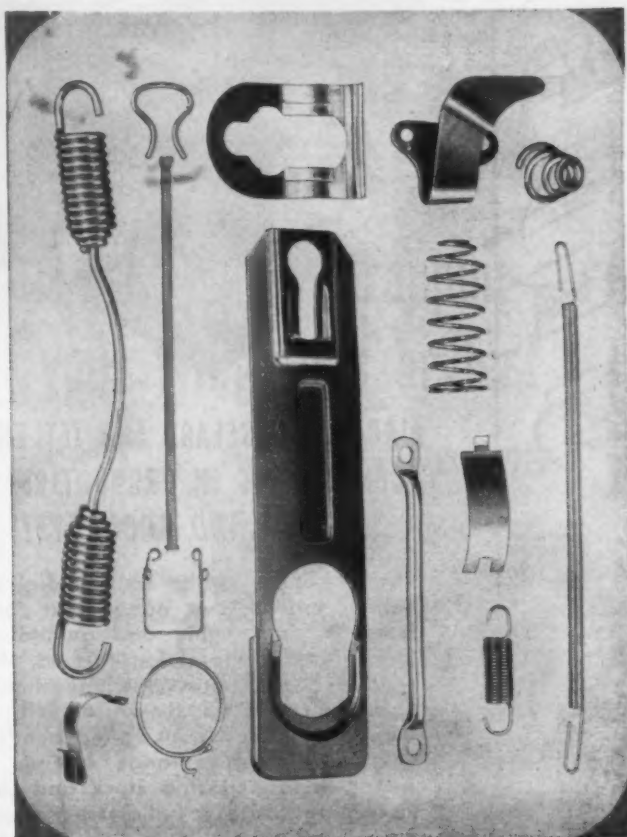
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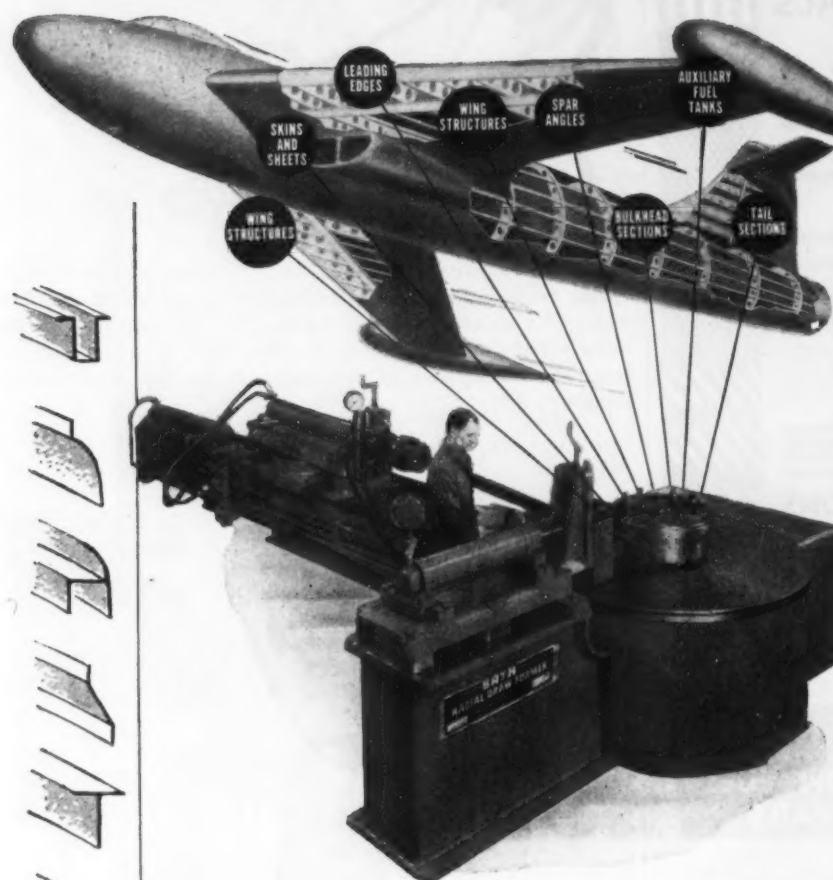
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The performance range extends from shallow bends in formed strip stock and sharp bends in flanged extrusions to full circles and spirals in metals from 24ST aluminum to titanium of 95% purity.

Machine capacities from 12½ to 200 tons in standard Models. Write for catalog CF-352.

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Technical Briefs

Powder Metallurgy:

Fifteen nations represented at Austrian seminar—By Dr. F. V. Lenei

Over 250 powder metallurgists from 15 nations outside the Iron Curtain swapped experiences on new developments and methods in power metal production at a recent seminar at Reutte-Tyrol, Austria.

The seminar met at Metallwerk Plansee, one of the largest integrated powder metallurgy plants in Europe producing tungsten, molybdenum and other refractory metal products including cemented carbides sintered magnets and structural parts from metal powders. The seminar was organized by Dr. Paul Schwarzkopf.



Modern Equipment — Production equipment at the plant for sintering cemented carbides is highly developed. Included are batteries of carbon resistor furnaces and vacuum high frequency induction furnaces which are operated at temperatures up to 3700°F.

Compacting presses for structural parts, however, are considerably slower than American presses. Ingenious die set-ups for compacting complicated parts to uniform density are the equal of those being designed in this country.

Need Longer Runs—Chief difficulty in producing structural parts in Europe is the lack of high production runs which make use of the powder metallurgy technique worth while.

During the meeting metal powder producers and fabricators from both Europe and America discussed problems of educating the machine designer to use of the powder metallurgy process.

Plans were made to cooperate in bringing out a booklet pointing out advantages and limitations of

the process. Dr. W. D. Jones, Powder Metallurgy Ltd., will be the editor.

Sintered Aluminum—Professor von Zeerleder of the Aluminium Industrie A. G. of Neuhausen, Switzerland, gave a detailed description of the production and the properties of the SAP sintered aluminum.

Sintered aluminum is produced from a ball milled flake aluminum powder with a flake thickness of 0.3 to 0.5 microns by increasing bulk density of the powder, cold pressing, sintering and hot pressing the resulting compact. Final operation may be forging or extruding.

High Strength—Most remarkable property of the SAP sintered aluminum, which contains from 8 to 13 pct oxide, is its high strength and hardness and strength at elevated temperatures. At room temperatures strength is 50,000 psi. At 932°F, where other aluminum products have negligible strength, it still possesses a tensile strength of 14,000 psi. It also has unusual creep properties. The new material has not yet found wide application, because of its relatively high price—over \$1 per lb.

Used In Engines—Principal interest for the material at present is for cylinders in internal combustion engines, particularly heavy duty diesel motors and for compressor blading in jet engines.

Dr. Fitzer, Technical University, Vienna described experiments on siliconizing tungsten and molybdenum. Results parallel experiments performed in this country at Battelle Memorial Institute and Fansteel Metallurgical Co. An interesting use for solid molybdenum silicide is in heating elements for electrical furnaces. Such an element, operating in air, was demonstrated.

A trend toward more complex compositions in the steel cutting grades of cemented carbides were noted by Carl Ballhausen of Deutsche Edeltahlwerke.

Steering Gears:

Precision testing on production basis possible at Chrysler.

Accurate control of efficiency of steering gears for automobiles, to insure car owners of steering with highest mechanical efficiency, and lowest effort, has been made possible by a new testing device.

Designed and built by Chrysler Corp. engineers, the new machine is a laboratory testing device made practical for use on the production line to bring research standards of precision to testing the efficiency of steering gears as they are manufactured.

Occupies Little Space — The portable machine occupies about the same amount of space as a cabinet-type kitchen sink. It applies a predetermined load to a gear to be tested and then very accurately records how much effort is required to operate the gear against this load.



LABORATORY PRECISION has been brought to the production line in testing efficiency of automobile steering gears at Chrysler Corp.

It automatically makes a tracing on a graph showing effort put into the gear to produce a given amount of work from the gear, thus precisely showing the gear's efficiency. The entire test requires less than 6 min.

Non-corrosive Flux Developed

A non-corrosive flux paste which can be used for soldering a variety of metals has been developed by the Army Signal Corps.

Turn Page

U-S-S Gerrard Steel Strapping fits all your tying jobs better!

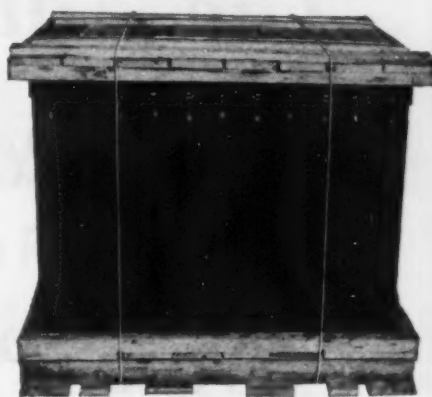
● Gerrard Round Steel Strapping is versatile enough for all types of packing, from light cartons to large crates, from circular packages to odd-shaped bundles and heavy pallets.

Gerrard Strapping complies fully with Army-Navy specifications JAN-P-106A, JAN-P-107, and JAN-P-108 for overseas packing. It assures a tight, secure tie to final destination.

Call a Gerrard engineer for further information about the grade of Gerrard Round Steel Strapping and the type of Gerrard machine that will best fit your specific tying needs.

GERRARD STEEL STRAPPING DIVISION
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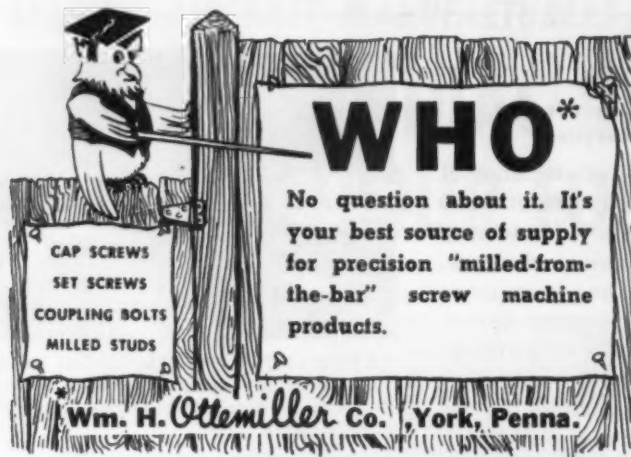


Pallet reinforced with Gerrard Round Steel Strapping permits quick packing and easy handling of shell cases.

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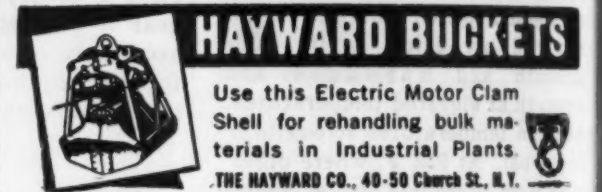


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of Metals**

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Technical Briefs

Gear Finishing:

Cleaning and peening costs cut in airless blast type machines.

Airless blasting for cleaning and peening is making important economies in the manufacture of gears at Fairfield Mfg. Co., Lafayette, Ind.

Rough forgings are purchased in the "as forged" condition. Scale from forging and annealing operations is removed in two standard tumble-type airless blasting machines made by American Wheelabrator & Equipment Corp., Mishawaka, Ind.

Use Conveyor Belt—Each machine has a 11½ cu ft barrel. Parts are tumbled by a continuous apron-type belt conveyor under the blast of abrasive thrown from a rotating, bladed wheel in the roof of the machine. A clean surface is provided for subsequent machining operations.

Second cleaning problem is removal of heat treat scale from the many sizes and shapes of gears produced. A multi-table type machine with eight 28-in. diam work tables mounted on a spider is used.

Tables Rotate—Tables rotate individually under the blast of metallic abrasive thrown from an airless wheel in the roof of the cabinet. This machine replaced manual cleaning in an airblast room and cut cleaning time in this operation one-third.

The table is also equipped with facilities for shot peening to increase fatigue life of gears. At the time this machine was purchased, Fairfield's metallurgical engineers investigated the possibility of a single machine suitable for both cleaning and shot peening.

Removes Worn Shot—Equipping the standard multi-table with certain special features, such as a closed air cycle separator to remove worn shot too small to be useful and a shot adding mechanism which automatically replaces the worn shot removed, made it suitable for

Turn Page

HEWITT-ROBINS

BEATS HEAT

Hewitt-Robins
Hot Materials
Conveyor Belting

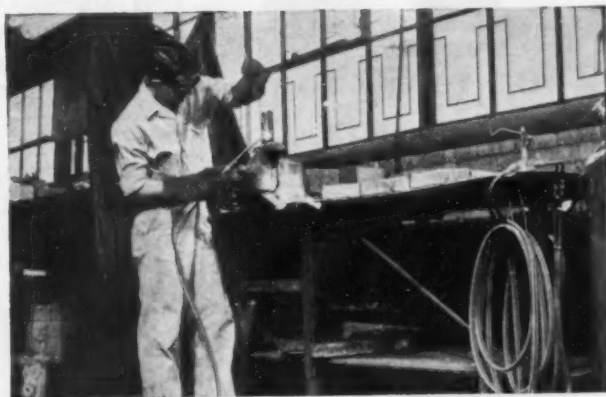


You will save costly belt replacement and downtime with Hewitt-Robins Maltese Cross® Fiberglass Conveyor Belting . . . the first successful hot material belting constructed with Fiberglass.* It resists extreme heat conditions that scorch and blister ordinary belts, for it will easily handle hot materials at temperatures of 350° or more.

Hewitt-Robins Hot Materials Belting is also available in fabric construction . . . *Maltese Cross* for handling fine, lumpy or highly abrasive materials up to 350° . . . *Ajax*® for moderately abrasive materials up to 250°.

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*T. M. of Owens-Corning Fiberglass Corp.



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Get the Whole Story: Call your Hewitt Rubber Distributor (see classified phone book) or write for Bulletin H-4.

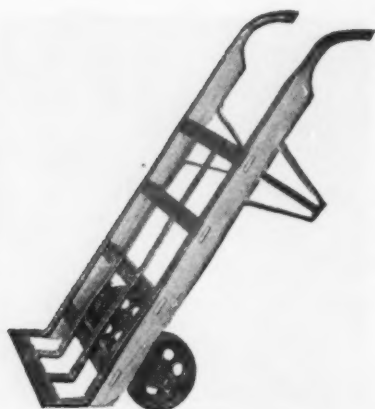
HEWITT-ROBINS INCORPORATED

STAMFORD

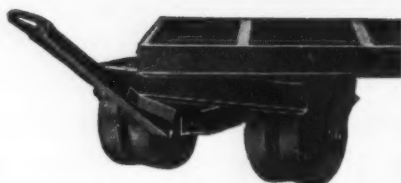
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Technical Briefs

peening ring gears in the horizontal position.

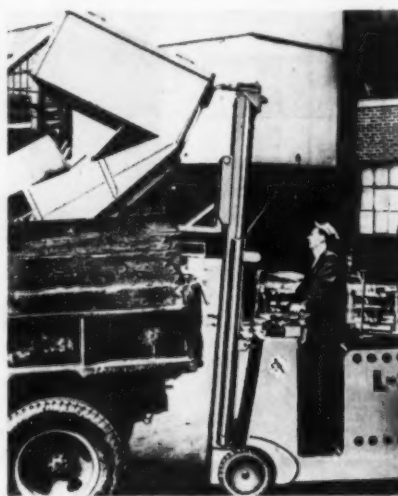
For worm, spur, and helical gears, a special traveling carriage consisting of an arbor spinner fixture was added to the machine.

Peening—Gears are first placed on the carriage which then travels into the blast zone. At one end of a pre-determined time in the blast, the car automatically returns to the work station. Maximum diameter gear which can be handled with the special attachment is 15 in. Larger gears can be peened by being placed on the standard work tables of the machine.

Truck Axles Have Long Guarantee

A new axle shaft free if the original shaft fails within 100,000 miles or 3 yr are the terms of a guarantee now offered owners of trucks equipped with axles by Timken-Detroit Axle Co.

According to the Automobile Mfrs. Assn. average annual mileage of all trucks is approximately 14,000 miles. Highest mileage is by inter-city truck common carriers which, in 1950, averaged 41,322 miles a year.



WASTE, SCRAP and other bulk materials are more easily handled using tiering bins with trap door bottoms. Made by Lewis-Shepard, Watertown, Mass., the bins tier to desired height. At right height a hook atop mast is engaged. As forks lower over dumping spot, bottom of box opens while hook holds rest of box in position.

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August 7, 1952

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Technical Briefs

Heat Barrier:

Planes need refrigeration to retain strength at jet speeds.

Planes of the future may be plagued by a heat barrier rather than the supersonic barrier. At the \$30 million Ames Aeronautical lab recently opened at Moffett Field near San Francisco it was predicted future planes must be refrigerated to retain strength of members at supersonic speeds.

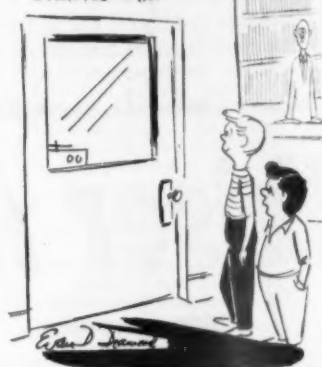
At twice the speed of sound a 40,000 ft air friction will generate 250° F heat on a wing and aluminum will lose 10 pct of its strength. At three times sonic speed, heat reaches 565° F and aluminum strength loses 90 pct.

Temperature Problem — "Ultimate limit in speed looks to be a temperature problem," Walter G. Vincenti, Ames research engineer said. It is expected a single place research plane will probably have to carry up to 500 lb of refrigeration equipment.

The Ames lab, operated by the civilian National Aeronautical Advisory committee, also showed off its 15 wind tunnels including some of the fastest in the world.

A new 6 by 6 ft tunnel is under construction which will have a drive totalling 216,000 hp—greatest power output ever harnessed to a single shaft. The new tunnel will handle models with up to 8-ft wingspan and will be used for supersonic planes and guided missiles.

RECORD YOUR VOICE
3 MINUTES 7 L.N.



Shall we do it now or wait till our voices change?

Turn Page

TOUGH PRODUCTION PROBLEMS

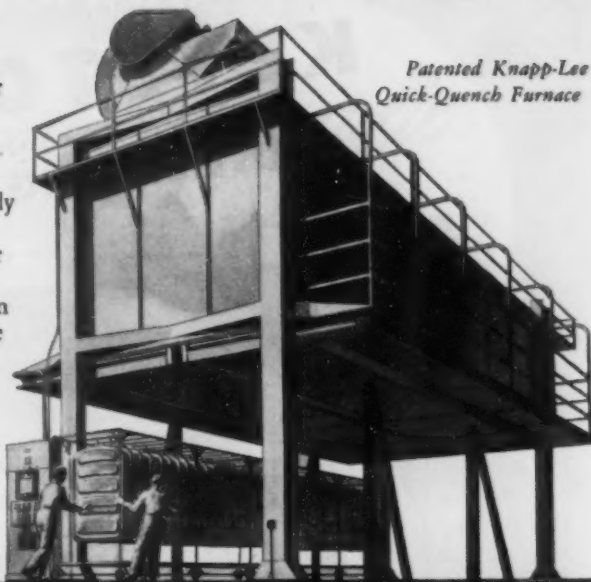
MADE EASIER WITH KNAPP'S 30 YEARS KNOW-HOW!

Manufacturers who have tough production schedules equip their plants with Knapp heat-treating equipment.

They are using them because they are built for **SPEED**:—Temperature recovery well within established limits. Quench adjustable from 3 to 8 seconds with arrested descent immediately before immersion, thus reducing impact and preventing excessive distortion; **EASE OF HANDLING**:—assured by floor level loading and unloading; **SAFETY**:—positive locking devices at floor level and top positions, all operations push button controlled by one operator; **ACCURACY**:—guaranteed variance of temperature not to exceed plus or minus 5°F in any part of the working zone after stabilization; **QUALITY**:—uniformly high physical and chemical properties due to the elimination of the human element.

Over 40 Airframe and other Manufacturers in the U.S. and abroad are meeting their production schedules with patented Knapp-Lee Quick-Quench furnaces.

The Knapp reputation for building better equipment is maintained throughout its entire line of standard and custom built furnaces. Knapp has the answer to your heat treating problems. Write today.



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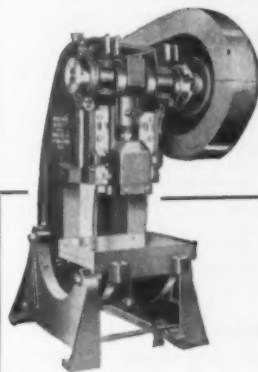


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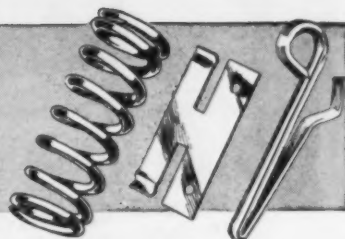
If you've kept posted on recent developments in power press design, you know you can expect greater output, reduced scrap, lower maintenance cost and safer operation than ever before!

That's because this press is loaded with new design features such as:

- Press-Rite Airflex Air Friction Clutch—Cuts clutch maintenance to practically zero!
- Single-Stroke Safety Mechanism—Increases operator efficiency.
- Triple Ramway Lubrication—Proper lubrication whether up-right or inclined.
- Special Frame with Built-in Tie Rods—Greater rigidity—Extra tonnage.

Any

- QUANTITY
- MATERIAL
- or SHAPE



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Stampings

Wire Forms

Parts like these are made to your specifications. When desired, spot welding, tapping and small assemblies can be provided. All tools and production equipment made in our plant. Send us your drawings or samples. Consult us on applications.

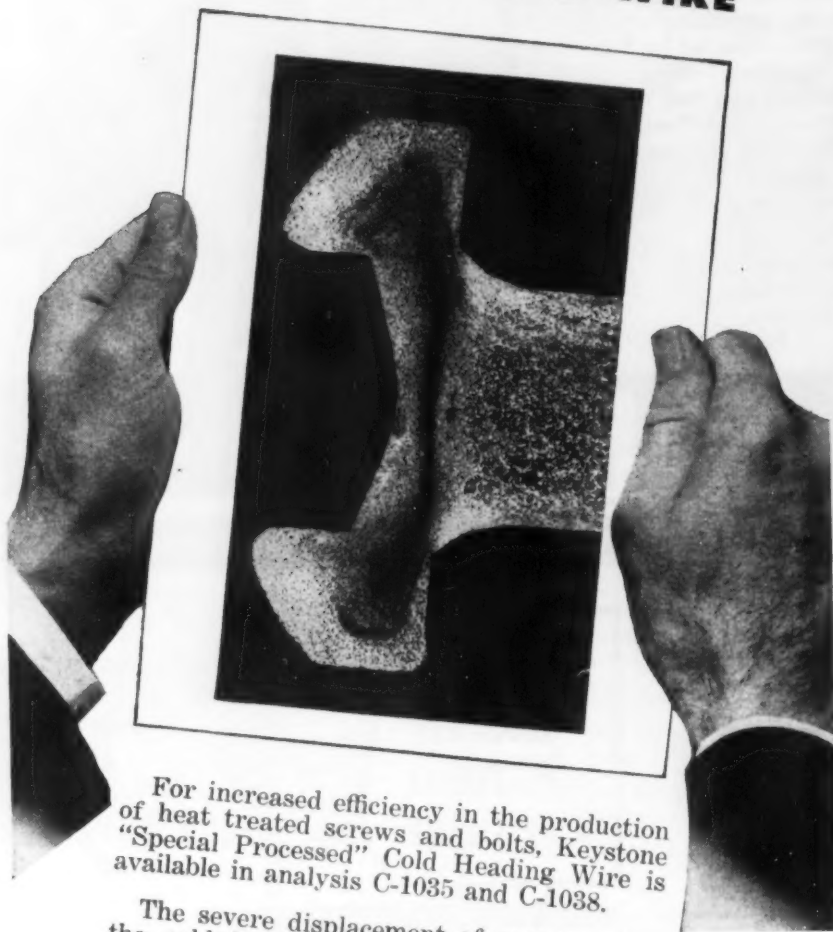
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COLD HEADING WIRE



For increased efficiency in the production of heat treated screws and bolts, Keystone "Special Processed" Cold Heading Wire is available in analysis C-1035 and C-1038.

The severe displacement of metal during the cold heading process requires special wire that will flow with unbroken fibres. The above macrograph clearly indicates the excellent grain flow in a recessed-head screw made from Keystone "Special Processed" C-1012 Cold Heading Wire.

Carefully selected ingredients — our own exclusive drawing and heat treating process — rigid quality controls and inspections — give this wire unsurpassed performance on any unusually difficult cold heading job.

INDUSTRIAL WIRE SPECIALISTS

Keystone Steel & Wire Company
PEORIA 7, ILLINOIS



Technical Briefs

Low-temperature Properties:

Effect of strain-temperature on ingot iron studied.

Strain aging has a pronounced effect on the true stress-strain relationship of ingot iron specimens extended in tension at temperatures as low as -120°C , the National Bureau of Standards recently found. Effects of strain-



INGOT IRON specimen immersed in bath of liquid nitrogen is tested in tension at National Bureau of Standards.

temperature history on low-temperature properties of ingot iron were studied.

Tensile specimens were extended at temperatures between -196° to $+100^{\circ}\text{C}$, to specified strain values and subsequently extended to fracture at different temperatures within the same range.

Data Compared—By comparing tensile data obtained in these tests with those of specimens extended to fracture in single-stage tests at the same temperatures, valuable information on the combined effect of previous strain and temperature was obtained.

At high temperatures metals creep at stresses below the yield strength. At room temperatures, metals vary greatly in ductility at fracture. At sub-zero temperatures, some metals and steels become noticeably embrittled, whereas other steels and certain non-

ferrous alloys may be tougher than at room temperature.

Strain-Temperatures—In recent years, investigations have indicated the true stress-strain relationship for metals and alloys extended in tension depends not only on the instantaneous values of strain, strain rate, and test temperature but also on previous strain-temperature history.

Ingot iron samples studied by NBS included annealed, hot-rolled, quenched and tempered, normalized, and cold-drawn. All were machined into cylindrical tensile specimens and extended in tension to specified strain values in a pendulum-type hydraulic testing machine of 50,000 lb capacity.

Kept Submerged—While undergoing deformation, specimens were kept submerged in a liquid bath maintained at the desired temperature, except in those tests made at room temperature. Through use of a specially designed reduction-in-area gage developed at NBS for low-temperature application, diameter of each specimen was measured during extension to an accuracy of ± 0.0001 in.

Specimens were first extended at selected temperatures ranging from -196° to $+100^{\circ}\text{C}$. After about $\frac{1}{2}$ hr, they were again extended—this time to fracture—at a different temperature.

Between the two stages of each test, the specimen was maintained at the lower temperature to minimize strain aging.

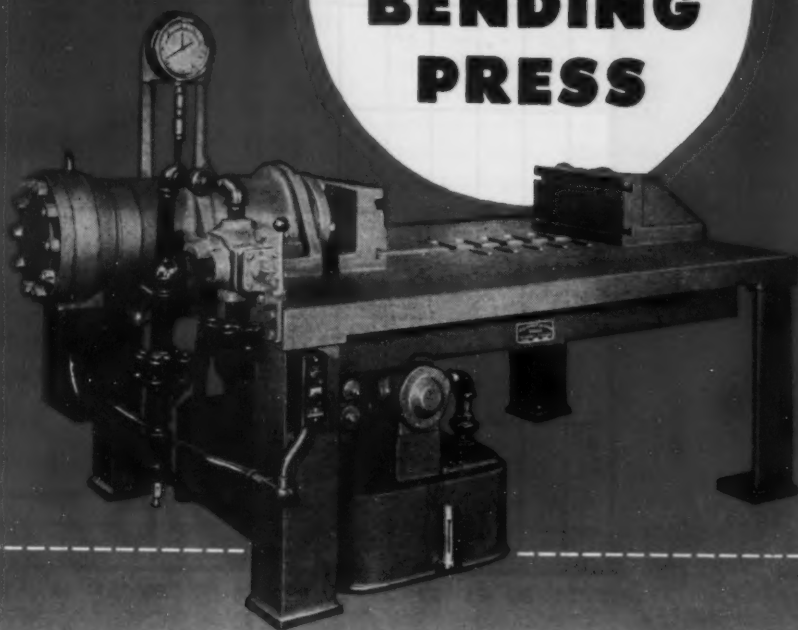


Turn Page

August 7, 1952

R. D. WOOD

Hydraulic BENDING PRESS



THIS compact 30-ton horizontal hydraulic press fits productively into general shop use—in the bending and straightening of rods, bars, light structural sections, and for similar work. Self-contained, it is well designed and constructed, with a smooth tool finished 3' x 4' steel work table, and 9" x 18" ram and resistance heads, machine tee slotted for dies or bending forms. Distance between rams is adjustable in 4" increments from 1' to 3'. The press stands $2\frac{1}{2}'$ above the floor at the work table, and occupies an approximate floor space of 7'3" x 4'6". Higher capacities and various size tables can be furnished. Write, without obligation, to R. D. Wood Company for additional information.

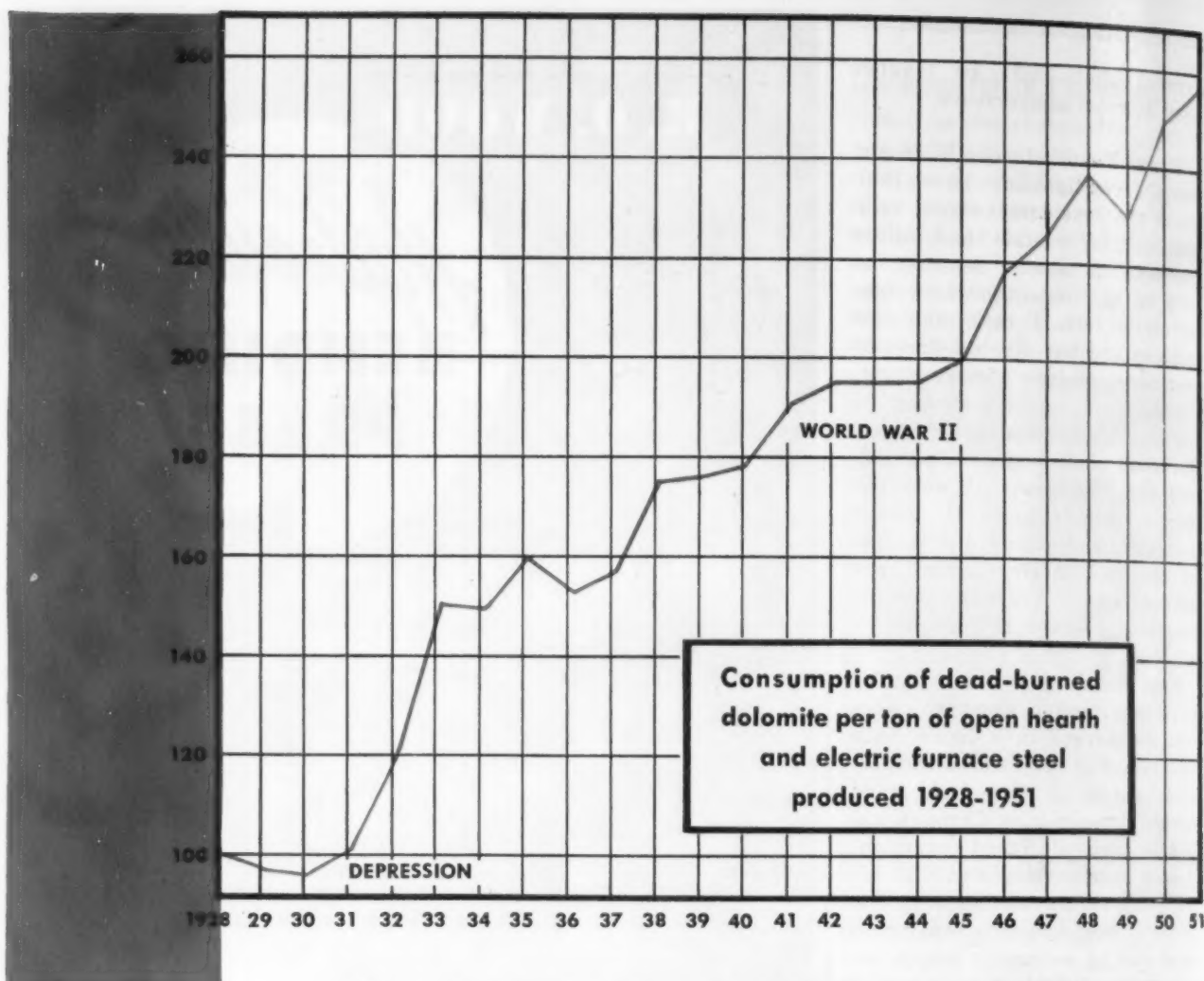
HYDRAULIC PRESSES AND VALVES FOR OTHER PURPOSES • ACCUMULATORS • ALLEVIATORS • INTENSIFIERS



R. D. Wood Company

EST. 1803

PUBLIC LEBAN BULBING, PHILADELPHIA 3, PA.



the uptrend in dead-burned dolomite

THIS chart presents a graphic picture of the trend in setting refractories. Taking as a base period 1928, the first year for which industry figures are available, it indicates the increase in consumption of dead-burned dolomite per ton of steel produced annually through 1951.*

Dead-burned dolomite was developed as a substitute for Austrian magnesite in 1914. At that time it was generally thought that the product would disappear when European shipments could be resumed. However, product and process research resulted in such improvement in quality and cost that the use of dead-burned dolomite climbed steadily throughout the 1920s. The trend gained impetus as a consequence of efforts of steelmakers through the depression

years to take greater advantage of the economies promised through the increased use of dead-burned dolomite.

Despite the consistently upward trend of 24 years, and the fact that the steel industry utilized slightly over 1 3/4 million tons last year, there have been few times since the late '30s when the supply of dead-burned dolomite was sufficient to permit any major shift to it by users of other setting materials. Now for the first time in 10 years, with two new kilns in operation at our Ohio Works, there are adequate supplies available for any steel producer who wishes to convert to dead-burned dolomite practice or to improve his present practice through the use of more of this quick-setting, dependable, low-cost refractory.

*Each year's figure expressed as percentage of base period.



Basic Refractories Incorporated

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Write for free booklet "Underlying Steel". This graphic booklet tells the story in words and pictures of granular basic refractories and their role in the production of open hearth steel. Address Dept. 14.

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Mills Facing Strongest Pressure From Customers

Steelmakers are optimistic they can meet demands . . . Government officials most pessimistic . . . Ingot rate rebounds . . . Scrap prices boosted . . . Military gets first call on output.

A special survey by THE IRON AGE shows opinion divided on how long it will take to overcome the handicap imposed by the steel strike. Military and controls officials in Washington are most pessimistic, estimating production in some vital lines will be hampered for a year. Most manufacturers expect steel shortages for 6 to 9 months. Steel producers, strangely enough, are most optimistic of all, expecting the pressure to ease by the first quarter of 1953.

But detailed analysis of reasons shows the opinions of these three groups are not really far apart. Military and controls officials are pessimistic because the shortest and most urgent items are forcefully brought to their attention—even though they frequently represent minority tonnage. When overall production becomes more than adequate these people will still be concerned about spot shortages of special, hard-to-make alloys for, say, the aircraft program.

Trump Card—Optimism of steel producers at the other extreme stems from confidence in the productive capacity of their own companies, and their expanded facilities. While some people still think in terms of 100 million ton capacity, annual steel capacity now exceeds 112 million ingot tons. This new and efficient capacity is the industry's ace in the hole. Most steel people think more in terms of tonnage products than they do in special items.

One thing is sure—for the rest of this year the steel market is going to be like a three-ring circus. With mills, warehouses and converters outdoing themselves, and

foreign entries trying to get in on the act.

Swarming—This week steel buyers are descending on the mills in droves. Some are checking on standing orders. Some are trying to place new ones. All are after one thing—steel. They are intent on preventing collapse of their manufacturing operations, or restoring production if plants are already down. Most of them will be disappointed.

The mills will have no open space for the rest of the year. Military and atomic energy directives are piling up. For at least the next month or two their share will be doubled. This means that what looks like a good order today will be pushed way back on the schedule tomorrow, making life just that much more uncertain for the civilian consumer.

Top Banana—All steel producers were notified last week to dust off a desk for a government liaison officer. His job will be to make certain defense business gets priority over all other orders until the defense program is back on schedule.

The mills are not in a position to advise customers on what to look forward to. They have no definite word from the military to indicate what will be left for non-defense consumers.

Way Down—Warehouses were cheered by the first trickle of mill shipments. But these token amounts won't go far toward healing their inventory wounds. Warehouse stocks are now estimated between 25 and 40 pct of normal. Such

limited inventory makes service difficult regardless of priority.

Conversion is back with a bang. As usual, auto producers are working it to the hilt. Appliance manufacturers are also following the devious conversion trails. But caution prevails. Manufacturers are reluctant to make conversion commitments beyond 90 days. Beyond that they are playing it cagey. Converters regard this as general distrust of the market, since the same buyers were dealing for 6 or 8 months back in 1951.

The Tightest—It is almost impossible to form a list of tightest steel items, since deficits have accrued on all types. The following are expected to remain in tight supply longest: Oil country goods, heavy plates, larger sizes of bars, both cold-finished and hot-rolled, and, of course, special alloy steels. Cold-rolled sheets and tinplate are under terrific pressure now, but this should ease in a few months.

Scrap Stronger—The scrap market has reacted to the steel settlement with resurgent strength. THE IRON AGE scrap steel composite price is now \$42.00 per gross ton, up 25¢ from last week. This reflects full ceiling price for heavy melting steel at main centers.

Industry sources do not bear out government estimates of the amount of iron ore that will have to be moved by all-rail shipment this winter. Close to 8 million tons were moved by rail last winter. Some government officials are advocating all-rail movement of two or three times that amount. But reliable sources in industry doubt the rail movement will be much if any higher than last year.

Steelmaking operations this week are scheduled at 87.0 pct of rated capacity, up 40 points from the previous week.

HOW THE **SCRAP** THAT JACK MADE —MADE JACK *AND MORE*



This is the Scrap that Jack made.



This is the Man who found the Scrap that Jack made.

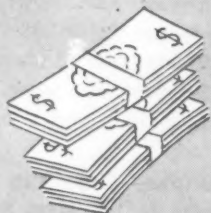


This is the Clerk who was called by the Man who found the Scrap that Jack made.



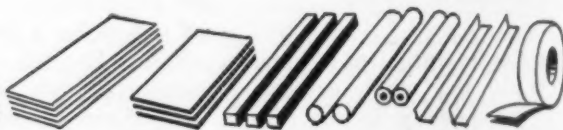
This is the Dealer who dealt with the Clerk who was called by the Man who found the Scrap that Jack made.

AND TO MAKE THE STORY SHORTER:



This is the jack the dealer paid for the Scrap that Jack made.

**AND THIS IS THE STEEL
THAT INDUSTRY GETS**



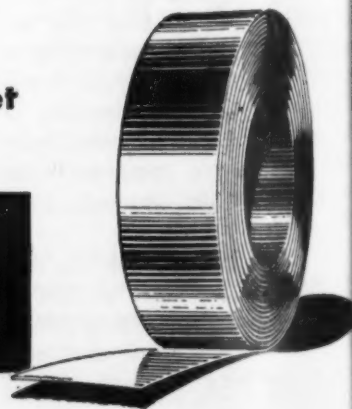
from the Scrap that Jack made!

MORAL:

**Check your Plant for Scrap Today and Get
it Moving — That Pays Everybody!**

Superior Steel

CORPORATION
CARNEGIE, PENNSYLVANIA



Market Briefs

New Steel Prices—Office of Price Stabilization last week issued an interim steel price order. Under its terms, steel producers are permitted an increase, the amount of which has not yet been calculated for individual products. Mills will ship steel, billing customers later at the higher prices. Effective date for the new rates was July 26. Amount of boost for each product will be dependent on man-hours of labor required for production, and the average will be about 4.7 pct. Delay is caused by reams of calculation required.

Decoration—Manufacturers of consumer durable goods will have more freedom to provide customer appeal in their products as a result of new National Production Authority actions permitting use of copper and aluminum for decorative purposes. NPA has amended orders M-47A and M-47B to allow removal of former end-use restrictions. These amendments, the agency says, are in line with the recent increase in self-authorization limits for copper and aluminum. No greater allocation of metals is produced by the new amendments.

Construction—National Production Authority will give top priority to making structural steel allotments to "critically important industrial expansion" projects for the remainder of this year. Under new criteria set up last week, NPA set up three categories in the order of their importance to guide the agency in giving preferential treatment. They are: (1) Necessary for defense; (2) new industrial starts to meet expansion goals; (3) other industrial expansion. The first category will get steel even if work has to be delayed on the others.

Castings Plant—Army expects to spend \$9.5 million rebuilding a government plant it took over last week for production of large tank castings. Located at Pittsburg, Calif., the plant will be operated by Columbia-Geneva Steel Div., U. S. Steel. Conversion of the plant will require several months.

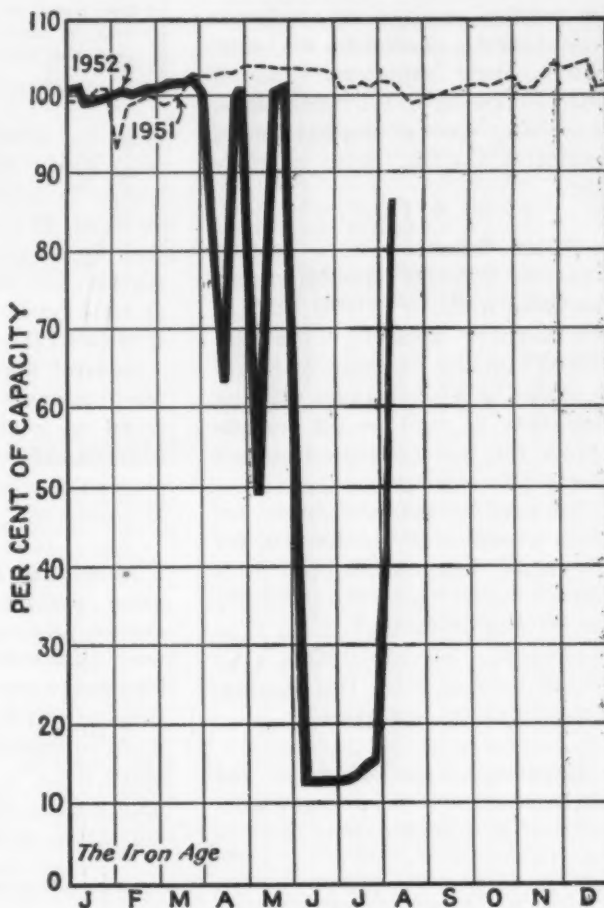
Auto Costs Up—Detroit automen estimate higher ceiling prices on steel will cost the industry about \$77 million. And the copper price hike will add another \$16 million to auto production costs. No estimate has as yet been made on the effects of the aluminum price increase.

Production Index Plummets—Federal Reserve Board expects July production index will be down 10 points from the June level as a result of the steel strike. And June production had dropped to 203 pct of the 1935-39 level as compared with a 221 pct rating in June, 1951.

Silicon Price Drop—Price reductions averaging 7 pct have been made on all grades of 90 pct ferrosilicon and silicon metal by Electro Metallurgical Co., Div. of Union Carbide & Carbon Corp. Price drops range from ½¢ a lb for regular 90 pct ferrosilicon, 1/5¢ for low-aluminum 90 pct ferrosilicon, to 2½¢ for low-calcium grade silicon metal.

Ore By Rail—Beginning this week, special trainloads of iron ore were arriving at U. S. Steel Corp. plants to offset loss of ore shipments during the strike. Approximately 600,000 tons a month will be shipped all-rail by U. S. Steel. Total will exceed 2 million tons. All-rail shipments cost \$1.50 more per ton than Lake-rail deliveries.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
July 27	50.0*	54.5*	42.0*	50.5*	51.5*	55.0	30.0	78.0	53.0*	37.5	55.0	82.0	44.0	47.0
Aug. 3	79.0	87.0	88.0	94.0	96.0	106.5	94.5	103.0	88.0	87.5	45.5	99.0	84.5	87.0

Beginning Jan. 1, 1952, operations are based on annual capacity of 106,587,670 net tons.

* Revised.

Private Tin Import Ban Ended

Firms may resume importation of tin from Aug. 1—if they can find buyers . . . Expect world markets to dip . . . Washington in hassle over aluminum price increase—By R. L. Hatschek.

End of the government's 16-month ban on private imports of tin on Aug. 1 means that Reconstruction Finance Corp. is now buying in foreign tin markets on the same footing with business firms.

Private firms are now free to import tin—in any quantities and at any prices—as long as they keep National Production Authority notified on their transactions. And domestic consumers may now choose their suppliers. Though still bound by NPA allocations, they may get allotments on a quarterly rather than monthly basis.

Better Balance—Jess Larson, General Services Administrator, has been in favor of this shift at the earliest possible time. He stated that the government would continue to buy tin under existing contracts as well as tin concentrates for the government-owned Texas City smelter.

Reasons for the government action, according to Mr. Larson, are the much improved supply position of the U. S. and the generally better supply-demand picture in the world. He anticipates even better balance with the resumption of private importing.

Importer's View—Firms in the business approve the action wholeheartedly. Now, they may do busi-

MONTHLY AVERAGE PRICES

The average prices of the major nonferrous metals in July based on quotations appearing in THE IRON AGE, were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley	24.50
Lake copper, delivered	24.625
Straits tin, New York	\$1.215
Zinc, East St. Louis	15.00
Zinc, New York	15.83
Lead, St. Louis	15.80
Lead, New York	16.00

ness but question whether they can. World markets are slightly higher than the New York equivalent of \$1.215, a price guaranteed by RFC. And who, the importers ask, will buy forward tin at this figure when they can get it from RFC?

General view, however, is that world markets will show a bearish trend as a result of this latest government action and the private companies should soon be able to do business.

Aluminum Prices—Government price stabilizers worked — or argued—through the weekend and were expected to issue new ceilings for aluminum early this week. Dispute was not whether but how much to increase prices. Producers asked a 2¢ to 2.25¢ hike for pig with a 10 to 12.5 pct rise in semi-fabricated and fabricated alumi-

num. Office of Price Stabilization officials cut these in half and were prepared to grant 1¢ for pig and 5 pct for other items. Others in the picture suggested 1.5¢ and 7 pct by way of compromise.

No Aluminum Strike—It now appears that 1952 will continue with labor peace in the aluminum industry. As previously reported, both Aluminum Co. of America and Kaiser Aluminum & Chemical Corp. have already signed contracts with the CIO and AFL unions. Now Reynolds Metals Co. has reached agreement with United Steel Workers (CIO) as to the terms of their new contract.

Tentative—until signed—contract with the 6500 USW members, about 50 pct of Reynolds' work force calls for a wage hike averaging 15¢ per hr retroactive to Apr. 15 when the last agreement expired. Another 4¢ productivity boost is also effective from that date.

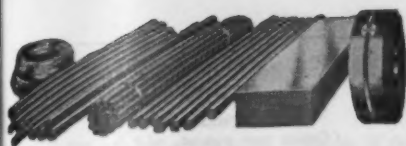
Fringes, very similar to other aluminum settlements, bring the total package to 21.4¢. New contract is set to expire July 31, 1953. Company is still dickering with Aluminum Workers Council (AFL)

Controls Eased—National Production Authority this week amended the revised CMP Reg. 6, Orders M-77 and M-100, and revoked M-74 which has the overall effect of increasing amounts of copper and aluminum which may be self-certified for construction and removed the ban on use of these metals for most uses in making building materials. Industrial projects may certify 4000 lb of aluminum and 5000 lb of copper per quarter. For highway projects, 500 lb of aluminum and 500 lb of copper may be self-certified. Others entitled to construction self-authorization may boost certification limits to 2000 lb of aluminum and 1000 lb of copper. Revocation of M-74 now permits use of both metals in making downspouts and gutters and other building materials.

NONFERROUS METAL PRICES

	July 30	July 31	Aug. 1	Aug. 2	Aug. 4	Aug. 5
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered ...	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	\$1.215	\$1.215	\$1.215	.....	\$1.215	\$1.215
Zinc, East St. Louis	15.00	15.00	15.00	15.00	15.00	15.00
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices.

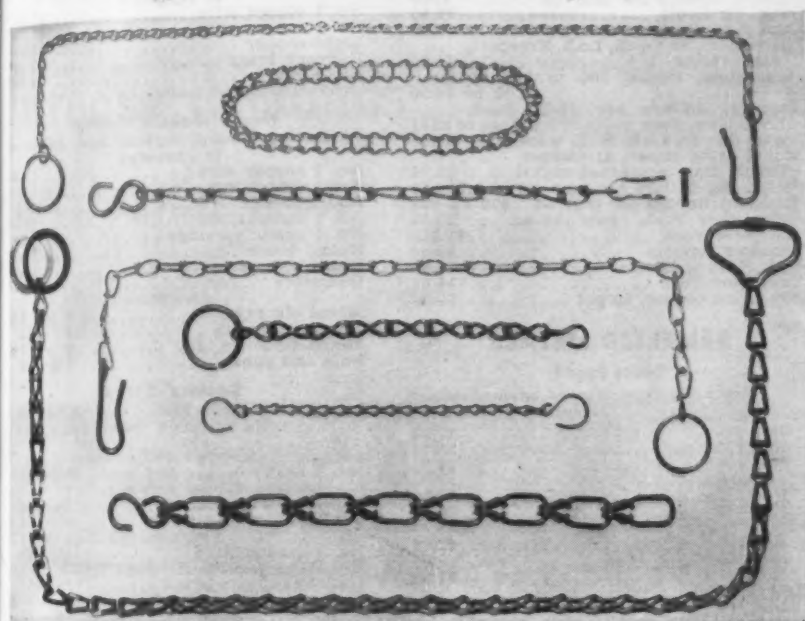


BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN



MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL



Chains for various uses made from copper-base alloys. Courtesy Bridgeport Chain Company, Bridgeport, Conn.

Modern Alloys Widen Chain Applications

Chainmaking is a completely automatic operation. A coil of wire or strip metal is fed into one end of the machine and finished chain literally pours out of the other end. The machine itself is the product of our mechanical age. Steel fingers guided by many intricate cams chop off the wire, bend it into position, and through perfect timing and constant repetition of the same operation make and join the links.

Finished chain must be strong and reliable and in many cases, resistant to corrosion from moisture, weathering and mechanical wear. That is where brass and bronze come into the picture.

Chain From Wire

Strength and toughness in chain depend largely upon the character of the metal from which it is made. The brass wire must be fairly stiff so that the loops in the links after setting will remain firmly closed and will hold when the chain is subjected to a strong pull, as is encountered in service. Yet the wire must not be too hard, as links may

be opened to insert rings or S hooks and must be closed again without weakening or cracking of the metal.

Since pull-test requirements are very high and both great strength and adequate ductility are needed to meet specifications, the composition of the alloy, temper, and grain size must be kept within closer laboratory control than metals for most other products.

Wire alloy 16 (approximately 65% copper and 35% zinc) is generally used for brass chain. It should have the correct temper and adequate strength to fulfill requirements. Consequently, it is supplied in cold drawn condition. Soft wire is not suitable for chain because the links would lack strength.

Chain From Strip Metal

Sash chain is made from strip metal, which is first blanked on a press into a shape resembling figure 8. The skeleton scrap is chopped up and directed to the scrap bin. The rows of blanks drop out of the machine faster than the eye can follow. One row of blanks

enters the chain machine which weaves one blank into the other, folds it and clinches the metal so that it takes a set.

Strip alloy No. 40 (approximately 65.5% copper, lead 0.2% and remainder zinc) is generally used for sash chain. The hard temper not only gives the chain its high strength but helps to make clean blanks free from excessive burrs. Even the small amount of lead in this alloy is helpful in blanking. However, too much lead would tend to weaken the alloy.

For outdoor exposures and for highly corrosive conditions, strip alloy No. 92 (approximately 89% copper, 2% tin and balance zinc) and alloy No. 10 (approximately 88% copper, 0.9% tin, remainder zinc) are widely used. The rich gold color of these alloys make them also suitable for decorative uses and costume jewelry.

Product Improvement Through Special Alloys

Do you want a tougher, stronger chain, one that will resist wear from abrasion? Consider the use of silicon bronze alloy No. 632 (approximately 97% copper, 3% silicon). This alloy combines the strength and toughness of mild steel with the corrosion resistance of copper. In addition it has excellent welding characteristics. Silicon bronze in wire and strip will do much to widen the application of chain for mechanical drives and for other places where high strength as well as resistance to rust and wear are needed for safety and protection.

Many other alloys can be used for chainmaking. Phosphor bronze alloy No. 36 (approximately 95% copper, 5% tin) has better corrosion resistance than the brasses. 18% nickel silver No. 565 is not only strong and corrosion resisting but is silver-white in color and may be used for purposes of both utility and decoration.

More information on various alloys in strip and wire forms are given in the Bridgeport Brass Company's "Technical Handbook." Our Metallurgical Laboratory service is available to help fabricators with their manufacturing problems by suggesting the most suitable alloys and tempers which will give greatest efficiency and economy. (8643)

Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 25, 38, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 76S-O, 76S-OAL, 39.9¢; 0.081 in., 2S, 38, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 76S-O, 76S-OAL, 41.8¢; 0.032 in., 2S, 38, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 76S-O, 76S-OAL, 52.2¢.

Plate 1/4 in. and heavier: 2S, 3S-F, 23.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 76S-O, 76S-OAL, 38.8¢.

Extruded Solid Shapes: shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.5¢ to \$1.16; 36 to 38, 47.2¢ to \$1.70.

Rod, Rolled: 1.6 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 38.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, 1/4 to 1 1/2 in., 53.5¢ to 42¢; 1/2 to 1 1/2 in., 41.5¢ to 39¢; 1 1/2 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 76S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-ST-5, OD in. 1 1/4 to 2, 37¢ to 54¢; 2 to 4, 35.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., \$1.42; 96 in., \$1.52; 120 in., \$1.90; 144 in., \$2.28. Gage, 0.24 x 28 in., 72 in., \$1.37; 96 in., \$1.89; 120 in., \$2.29; 144 in., \$2.79. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb; 0.024 in. x 28 in., 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FSI-O, 1/4 in., 63¢; 3/16 in., 65¢; 1/2 in., 67¢; B & S Gage 10, 68¢; 12, 72¢. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., 1/4 to 0.311 in., 74¢; 1/2 to 1/4 in., 57.5¢; 1 1/4 to 1.749 in., 53¢; 2 1/2 to 5 in., 48.5¢. Other alloys higher. Base up to 1/4 in. diam, 10,000 lb; 1/2 to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to 1/2 lb, 10,000 lb; 1/2 to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.067; 1/4 in. to 5/16, \$1.40; 5/16 to 3/4, \$1.26; 3/4 to 1, \$1.34; 1 to 2 in., 76¢; 0.165 to 0.219, 1/2 to 3/4, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, \$15; Plate, HR, \$12; Wire, rolled and/or drawn, \$10; Bar, HR or forged, \$6; Forgings, \$6.

Nickel and Monel

(Base prices, f.o.b. mill)

"A" Nickel Monel
Sheets, cold-rolled 77 60 1/2
Strip, cold-rolled 83 63 1/2
Rods and bars 73 58 1/2
Angles, hot-rolled 73 58 1/2
Plates 75 59 1/2
Seamless tubes 106 93 1/2
Shot and blocks 53 1/2

Copper, Brass, Bronze

(Freight prepaid on 100 lb)

	Sheet	Rods	Extruded Shapes
Copper	45.52		45.12
Copper, h-r		41.37	
Copper, drawn		42.62	
Low brass	42.34	42.03	
Yellow brass	40.17	39.86	
Red brass	43.10	42.79	
Naval brass	44.72	38.78	40.04
Lead brass			38.02
Comm'l bronze	44.39	44.08	
Mang. bronze	48.44	42.83	43.89
Phos. bronze	64.72	64.97	
Muntz metal	42.69	38.25	39.50
Ni silver, 10 pct	51.96	54.18	

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed 19.00
Aluminum pig 18.00
Antimony, American, Laredo, Tex. 39.00
Beryllium copper, 3.75-4.25% Be. \$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be \$69.50
Bismuth, ton lots \$2.25
Cadmium, d'ld \$2.25
Cobalt, 97-99% (per lb) \$2.40 to \$2.47
Copper, electro, Conn. Valley 24.50
Copper, Lake, delivered 24.65
Gold, U. S. Treas., dollars per oz. \$35.00
Indium, 99.8%, dollars per troy oz. \$2.25
Iridium, dollars per troy oz. \$200
Lead, St. Louis 15.80
Lead, New York 16.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb. 24.50
Magnesium, sticks, 100 to 500 lb, 42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York \$188 to \$191
Nickel electro, f.o.b. N. Y. warehouse 59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel 52.75
Palladium, dollars per troy oz. \$24.00
Platinum, dollars per troy oz. \$90 to \$93
Silver, New York, cents per oz. 83.25
Tin, New York \$1.215
Titanium, sponge \$5.00
Zinc, East St. Louis 15.00
Zinc, New York 15.83
Zirconium copper, 50 pct \$6.30

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot
No. 115 27.25
No. 120 26.75
No. 123 26.25
80-10-10 ingot
No. 305 33.00
No. 315 30.50
88-10-2 ingot
No. 210 41.50
No. 215 40.00
No. 245 34.50
Yellow ingot
No. 405 33.25
Manganese bronze
No. 421 30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper, max. 20.5
0.60 copper, max. 30.4
Piston alloys (No. 122 type) 19.5
No. 12 alum. (No. 2 grade) 18.5
108 alloy 19.6
195 alloy 20.8
13 alloy (0.60 copper max.) 20.8
ASX-679 19.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97 1/2% 18.80
Grade 2—92-95% 18.60
Grade 3—90-92% 18.40
Grade 4—85-90% 18.20

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper
Cast, oval, 15 in. or longer 37.84
Electrodeposited 33 1/2
Flat rolled 38.34
Forged ball anodes 43
Brass, 80-20
Cast, oval, 15 in. or longer 34 1/2
Zinc, oval 26 1/2
Ball, anodes 25 1/2
Nickel, 99 pct plus
Cast 76.00
Rolled, depolarized 77.00
Cadmium \$2.40
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn. 97 1/2

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum 63
Copper sulfate, 99.5 crystals, bbl. 12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed 20 1/2
Nickel chloride, 375 lb drum 27 1/2
Silver cyanide, 100 oz lots, per oz. 67 1/2
Sodium cyanide, 96 pct domestic 200 lb drums 19.25
Zinc cyanide, 100 lb drum 47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1/2¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21 1/2	20 1/2
Yellow brass	19 1/2	17 1/2
Red brass	20 1/2	19 1/2
Comm. bronze	20 1/2	19 1/2
Mang. bronze	18 1/2	17 1/2
Brass rod ends	18 1/2	17 1/2

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire 19.25
No. 2 copper wire 17.75
Light copper 16.50
Refinery brass 17.25
Radiators 14.75
* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire 19.25
No. 2 copper wire 17.75
Light copper 16.50
No. 1 composition 18.50
No. 1 comp. turnings 18.25
Rolled brass 16.50
Brass pipe 16.50
Radiators 14.75

Aluminum

Mixed old cast. 9 — 3 1/2
Mixed new clips 10 — 11
Mixed turnings, dry 9 — 3 1/2
Pots and pans 8 1/2 — 9

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire. 18 1/2 — 19 1/2
No. 2 heavy copper and wire. 17 — 17 1/2
Light copper 16 1/2 — 18
New type shell cuttings 16 1/2 — 18
Auto radiators (unsweated) 14 — 14 1/2
No. 1 composition 17 1/2 — 18
No. 1 composition turnings 17 — 17 1/2
Unlined red car boxes 16 1/2 — 17
Cocks and faucets 15 — 15 1/2
Mixed heavy yellow brass 11 1/2 — 13
Old rolled brass 14 1/2 — 15
Brass pipe 16 1/2 — 18
New soft brass clippings 14 — 14 1/2
Brass rod ends 15 1/2 — 18
No. 1 brass rod turnings 15 — 15 1/2

Aluminum

Alum. pistons and struts 6 — 6 1/2
Aluminum crankcases 7 — 7 1/2
2S aluminum clippings 10
Old sheet and utensils 7 — 7 1/2
Borings and turnings 5 — 6
Misc. cast aluminum 7 — 7 1/2
Dural clips (24S) 7 — 7 1/2

Zinc

New zinc clippings 8
Old zinc 6
Zinc routings 3 — 2 1/2
Old die cast scrap 5 — 5 1/2

Nickel and Monel

Pure nickel clippings 35 — 36
Clean nickel turnings 35 — 36
Nickel anodes 35 — 36
Nickel rod ends 35 — 36
New Monel clippings 28 — 29
Clean Monel turnings 28 — 29
Old sheet Monel 28 — 29
Nickel silver clippings, mixed. 13 — 14
Nickel silver turnings, mixed. 12 — 13

Lead

Soft scrap, lead 12 — 12 1/2
Battery plates (dry) 7 — 7 1/2
Batteries, acid free 4 — 4 1/2

Magnesium

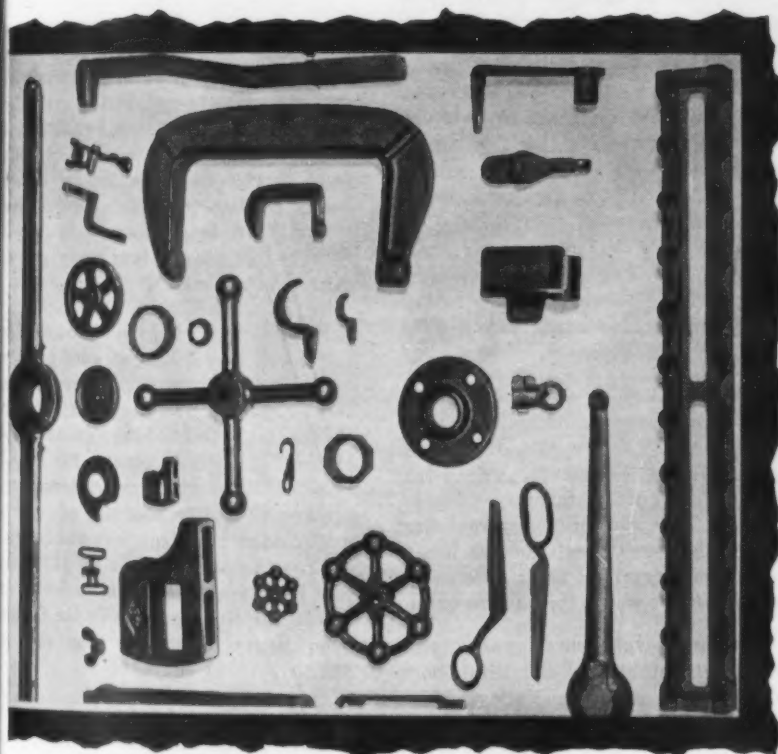
Segregated solids 15 — 16
Castings 14 — 15

Miscellaneous

Block tin 100 — 110
No. 1 pewter 70
No. 1 auto babbitt 65 — 66
Mixed common babbitt 14 1/2 — 14 3/4
Solder joints 19 — 20
Siphon tops 19 — 19 1/2
Small foundry type 15 1/2 — 16
Monotype 13 1/2 — 14
Lino. and stereotype 12 1/2 — 13 1/2
Electrotype 9 1/2 — 10
Hand picked type shells 9
Lino. and stereo. dross 6
Electro. dross 4

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AVAILABILITY

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August 7, 1952

Steel Grades Riding High at Ceiling

Ceiling prices for openhearth grades stick . . . Turnings grades put up show of strength, reach for ceilings . . . Even cast is in the trend . . . High steelmaking rate will aid scrap trade.

The awakened scrap market is roaring with awareness of its strength. Scythed down during the long steel strike, OPS ceiling prices on steelmaking grades have bounced back.

Although still moving sluggishly, the turnings group was putting up a show of strength founded on optimism. These grades would be in increasing demand as the weeks wore on. Turnings are reaching for ceiling levels and many scrap men expect them to get hold of their mark shortly.

Even much-spurned cast was kicking with new life as price rises were registered in some areas. In some districts dealers were stubbornly clinging to cast stocks in opposition to lower prices offered in the "certainty" they'll be climbing soon.

Despite the heat that slowed yard activity and the further slowdown of industrial scrap flow that is imminent, brokers and dealers were swinging into full business activity with a zeal engendered by a long layoff. Mills were entering the market and some scrap men expect normal shipments by the end of this week.

Pittsburgh—Consumers are accepting shipments on a regulated basis. As the ingot rate goes up, scrap is expected to move more freely. The market continues strong, with ceiling prices prevailing on all grades except turnings and cast. Both of the latter grades are showing greater strength. None of the major consumers is interested in new buying for the present.

Chicago — Faces were brighter in scrap circles last week and the only gloom came from people still filling below ceiling orders. Mills in the Chicago area were again taking scrap, although freight springboards were still not visible to any degree. There had been reports of a springboard sale 2 weeks previous. All grades were

going well with the exception of cast, and even there sales prospects were looking considerably brighter.

Philadelphia — Bounce that started in scrap prices at the end of the steel strike was continuing in this market last week. Steelmaking grades were all reported at ceiling prices, as were electric furnace grades. Cast items were higher and expected to hit ceilings within a week or two. Yard intake has not improved—it's too hot—but auto wreckers have resumed cutting. Morrisville, in-again-out-again, was once again accepting shipments.

New York—The old zip was coming into the market on steelmaking grades. Shipments were expected to be much improved by the end of this week. Ceiling prices on steelmaking grades were a fact. Old orders are being worked off. Turnings were moving up in a show of strength that will probably lead to ceiling prices again. Cast was growing strong and prices moved up. Not much was moving, however, in turnings and cast as yet.

Detroit—Markets here had returned to OPS levels and dealers were hoping that cast would follow suit. Mills were again taking shipments, everybody felt good. A note of mystery was the fact that few new orders were being written, however. Dealers were hanging on more firmly to their reserves if cast, feeling it would increase in value.

Cleveland—Openhearth grades seem fairly well established at ceilings both in Cleveland and the Valley. Shipments continue steadily at ceiling prices into the Valley while some scrap was due to be released for Cleveland this week. As yet this strength has not been fully reflected in the turnings market. One small Ohio consumer bought machine shop turnings and short shoveling turnings at ceiling for openhearth use. Cast iron borings and mixed borings and turnings are not said to be so strong.

St. Louis—Ceiling prices continue to prevail for all items on the scrap list, except unstripped motor blocks. Only new buying of consequence was that

of a Peoria, Ill., mill, which came into the market for the first time in 2 months with a substantial order for No. 2 heavy melting, No. 1 bundles and some cast iron grades. Steel mills that were affected by the strike have released only limited quantities.

Birmingham — Nearly all purchase orders placed with southern scrap yards prior to the steel strike are now being accepted and a few "token" orders are being placed at ceiling prices. Birmingham brokers report. But so far there has been no heavy buying. No cast is being sold in the district because of determination of dealers to get \$49 for No. 1 cast, while foundries are refusing to meet this price. Brokers report offers by buyers ranging from \$45 to \$47, with one customer paying as high as \$48 for 1 day only last week.

Cincinnati — Scrap prices here are once again at ceiling. Mill buyers fully expected to pay ceiling prices plus springboards to get in the scrap for August. Dealers seem to be pretty well covered and are not anxious at all to sell short. Some quarters believe heavy buying will taper off in a few weeks. Cast is stronger with reports of a car of stove plate being sold at ceiling last week.

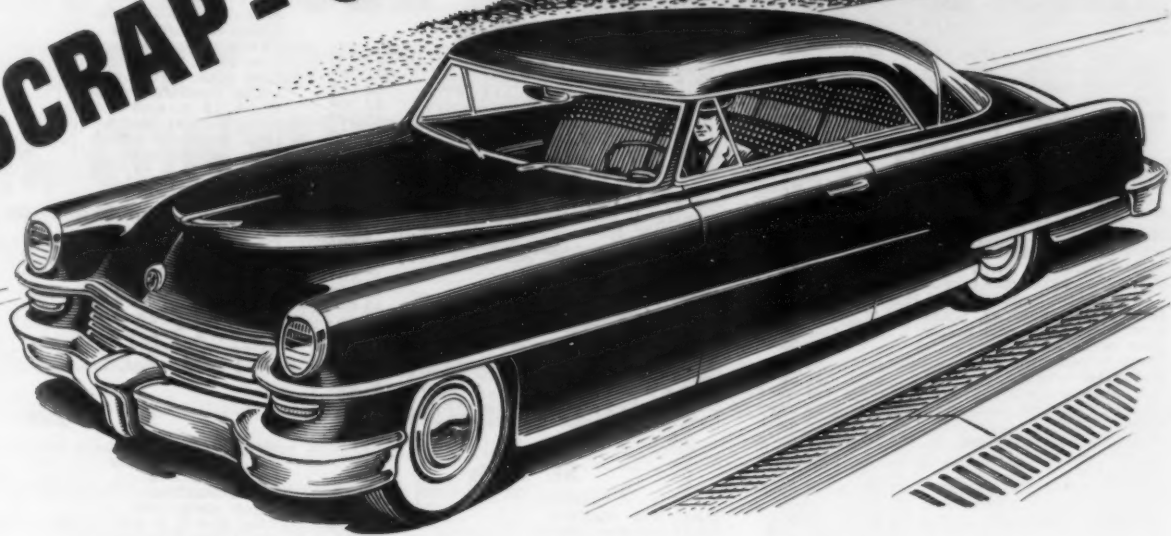
West Coast—All steel producers in the West were taking in good tonnage following resumption of production. Dealer stocks were moving freely. Prices on steelmaking grades continued at ceiling except for No. 2 bundles. Rise in cast prices brought on apparently by the shortage of pig iron extended to San Francisco and Seattle. In Los Angeles it rose to \$48.50, in San Francisco to \$46 and in Seattle to \$40.50 for No. 1 cupola. In the Seattle area heavy breakable also rose to \$35.50.

Boston—There has been a noticeable pickup in scrap activity here. It's nothing really great, but it's still far better than for the past several weeks. Openhearth scrap is all moving at full ceiling prices. Blast furnace materials and cast grades are all stronger at higher prices.

Buffalo — All leading consumers lifted the embargo on scrap shipments at the start of the week. The action tended to inject strength into market. Prices, however, were unchanged with steelmaking grades still below ceiling.



SCRAP - lifeblood of industry

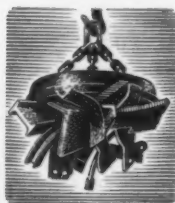


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CLEVELAND, OHIO NEW YORK, N. Y. SAN FRANCISCO, CAL.
SEATTLE, WASH.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

August 7, 1952

Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$43.00*
No. 2 hvy. melting	43.00*
No. 1 bundles	44.00*
No. 2 bundles	43.00*
Machine shop turn.	31.00
Mixed bor. and ms. turns.	31.00
Shoveling turnings	\$35.00 to 35.50
Cast iron borings	34.00 to 34.50
Low phos. punch'gs, plate	46.00*
Heavy turnings	\$35.00 to 36.00
No. 1 RR. hvy. melting	46.00*
Scrap rails, random lgth.	48.00*
Rails 2 ft and under	52.00*
RR. steel wheels	51.00*
RR. spring steel	51.00*
RR. couplers and knuckles	51.00*
No. 1 machinery cast.	52.00
Cupola cast.	46.50 to 47.00
Heavy breakable cast.	45.00
Malleable	55.00

Chicago

No. 1 hvy. melting	\$41.50*
No. 2 hvy. melting	41.50*
No. 1 factory bundles	42.50*
No. 1 dealers' bundles	42.50*
No. 2 dealers' bundles	41.50*
Machine shop turn.	32.50*
Mixed bor. and turn.	36.50*
Shoveling turnings	36.50*
Cast iron borings	36.50*
Low phos. forge crops	\$50.00 to 45.00*
Low phos. punch'gs, plate	45.00*
Low phos. 3 ft and under	44.00 to 45.50
No. 1 RR. hvy. melting	44.60*
Scrap rails, random lgth.	46.60*
Rerolling rails	51.50*
Rails 2 ft and under	50.50*
Locomotive tires, cut	49.50*
Angles and splice bars	47.50*
RR. steel car axles	49.50*
RR. couplers and knuckles	56.50*
No. 1 machinery cast.	47.00 to 49.50*
Cupola cast.	48.00
Heavy breakable cast.	44.00 to 45.00
Cast iron brake shoes	37.00 to 39.00
Cast iron car wheels	41.00†
Malleable	47.00†
Stove plate	52.00 to 53.00
	41.00 to 42.00

Philadelphia

No. 1 hvy. melting	\$41.50*
No. 2 hvy. melting	41.50*
No. 1 bundles	42.50*
No. 2 bundles	41.50*
Machine shop turn.	32.50*
Mixed bor. and turn.	36.50*
Shoveling turnings	36.50*
Clean cast chem. borings	\$36.50 to 37.00
Low phos. punch'gs, plate	45.00*
Low phos. 3 ft and under	45.50*
Low phos. bundles	44.50*
Hvy. trimmings	41.50*
RR. steel wheels	49.50*
RR. spring steel	49.50*
Rails 18 in. and under	52.50*
Cupola cast.	45.00 to 46.00
Heavy breakable cast.	40.00 to 41.00
Cast iron car wheels	47.00†
Malleable	55.00†
Unstripped motor blocks	34.00 to 35.00
Drop broken mach'y cast.	48.00 to 49.00
Charging box cast.	39.00 to 40.00

Cleveland

No. 1 hvy. melting	\$42.00*
No. 2 hvy. melting	42.00*
No. 1 busheling	43.00*
No. 1 bundles	43.00*
No. 2 bundles	42.00*
Machine shop turn.	29.00
Mixed bor. and turn.	29.00
Shoveling turnings	\$33.00 to 33.50
Cast iron borings	33.00 to 33.50
Low phos. 2 ft and under	48.00*
No. 1 RR. hvy. melting	45.00*
Rails 3 ft and under	50.00*
Rails 18 in. and under	53.00*
No. 1 machinery cast.	48.50 to 49.50
Cast iron car wheels	47.00†
Stove plate	45.00 to 46.00
Malleable	51.00 to 52.00

Youngstown

No. 1 hvy. melting	\$43.00*
No. 2 hvy. melting	43.00*
No. 1 bundles	44.00*
No. 2 bundles	43.00*
Machine shop turn.	30.00
Shoveling turnings	\$34.00 to 34.50
Cast iron borings	34.00 to 34.50
Low phos. plate	46.50*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

*Scrap at basing point ceiling. Broker's fee not included.

†Scrap at shipping point ceiling. Broker's fee not included.

Buffalo

No. 1 hvy. melting	\$37.00 to \$38.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bushelings	38.00 to 39.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	37.00 to 38.00
Machine shop turn.	28.00 to 29.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00
Low phos. plate	45.50*
Scrap rails, random lgth.	47.00*
Rails 2 ft and under	51.00*
RR. steel wheels	50.00*
RR. spring steel	50.00*
RR. couplers and knuckles	50.00*
No. 1 machinery cast.	45.00†
No. 1 cupola cast.	40.00 to 41.00
Small indus. malleable	55.00†

Birmingham

No. 1 hvy. melting	\$38.00*
No. 2 hvy. melting	38.00*
No. 1 bundles	39.00*
Electric furnace bundles	41.00*
No. 2 bundles	38.00*
No. 1 busheling	39.00*
Machine shop turn.	29.00*
Shoveling turnings	33.00*
Cast iron borings	33.00*
Bar crops and plate	44.00*
Structural and plate, 3 ft.	44.00*
No. 1 RR. hvy. melting	41.00*
Scrap rails, random lgth.	43.00*
Rerolling rails	48.00*
Rails 2 ft and under	47.00*
Angles & splice bars	46.00*
Std. steel axles	53.00*
No. 1 cupola cast.	\$47.00 to 49.00
Stove plate	40.00 to 41.00
Cast iron car wheels	47.00†
Charging box cast.	39.00 to 40.00
Heavy breakable	36.00 to 37.00
Drop broken machinery	42.00 to 43.00
Unstripped motor blocks	35.00 to 36.00

St. Louis

No. 1 hvy. melting	\$40.00*
No. 2 hvy. melting	40.00*
No. 2 bundled sheets	40.00*
Machine shop turn.	31.00*
Shoveling turnings	35.00*
Rails, random lengths	45.00*
Rails 3 ft and under	48.00*
Locomotive tires, uncut	45.00*
Angles and splice bars	48.00*
Std. steel car axles	55.00*
RR. spring steel	48.00*
Cupola cast.	49.00†
Hvy. breakable cast.	38.00
Cast iron brake shoes	41.00†
Stove plate	46.00†
Cast iron car wheels	47.00†
Malleable	55.00†
Unstripped motor blocks	35.00

New York

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	\$35.99*
No. 2 hvy. melting	35.99*
No. 2 bundles	35.99*
Machine shop turn.	\$24.00 to 26.00
Mixed bor. and turn.	28.00 to 30.00
Shoveling turnings	28.00 to 30.00
Clean cast chem. borings	30.00 to 30.50
No. 1 machinery cast	44.00 to 45.00
Mixed yard cast	38.00 to 40.00
Charging box cast.	41.00 to 42.00
Heavy breakable cast.	43.00 to 45.00
Unstrp. motor blocks	32.00 to 33.00

Boston

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	\$33.17*
No. 2 hvy. melting	33.17*
No. 1 bundles	34.17*
No. 2 bundles	33.17*
No. 1 busheling	34.17*
Machine shop turn.	\$20.00 to 21.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	25.00 to 26.00
Clean cast chem. borings	25.00 to 26.00
Mixed cupola cast.	36.00 to 38.00
Heavy breakable cast.	33.00 to 35.00
Stove plate	33.00 to 34.00

Detroit

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	\$39.36*
No. 2 hvy. melting	39.36*
No. 1 bundles, openhearth	40.30*
No. 1 bundles, electric	42.30*
New busheling	40.30*
Machine shop turn.	30.30*
Mixed bor. and turn.	34.30*
Shoveling turnings	34.30*
Cast iron borings	34.30*
Low phos. punch'gs, plate	42.70*
No. 1 cupola cast.	\$46.00 to 47.00
Heavy breakable cast.	41.00 to 43.00
Stove plate	42.00
Automotive cast.	48.00 to 49.00
Cast iron brake shoes	39.00

Cincinnati

No. 1 hvy. melting	\$42.00*
No. 2 hvy. melting	42.00*
No. 1 bundles	43.00*
No. 2 bundles	43.00*
Machine shop turn.	33.00*
Mixed bor. and turn.	37.00*
Shoveling turnings	37.00*
Cast iron borings	37.00*
Low phos. plate	45.50*
Low phos. 2 ft and under	48.00*
Rails, random lengths	47.00*
Rails, 18 in. and under	53.00*
No. 1 cupola cast.	\$46.00 to 47.00
Hvy. breakable cast.	39.00 to 40.00
Drop broken cast.	49.00 to 50.00

San Francisco

No. 1 hvy. melting	\$34.00*
No. 2 hvy. melting	34.00*
No. 1 bundles	35.00*
No. 2 bundles	29.00
Machine shop turn.	20.00
Elec. fur. 1 ft and under	41.00*
No. 1 RR. hvy. melting	37.00*
Scrap rails random lgth.	39.00*
No. 1 cupola cast.	46.00

Los Angeles

No. 1 hvy. melting	\$34.00*
No. 2 hvy. melting	34.00*
No. 1 bundles	35.00*
No. 2 bundles	29.00
Mach. shop turn.	41.00*
Elec. fur. 1 ft and under	37.00*
No. 1 RR. hvy. melting	39.00*
Scrap rails, random lgth.	48.50
No. 1 cupola cast.	48.50

Seattle

No. 1 hvy. melting	\$34.00*
No. 2 hvy. melting	34.00*
No. 1 bundles	35.00*
No. 2 bundles	29.00
Mach. shop turn.	41.00*
Elec. fur. 1 ft and under	37.00*
No. 1 RR. hvy. melting	39.00*
Scrap rails, random lgth.	48.50
No. 1 cupola cast.	48.50

Hamilton, Ont.

No. 1 hvy. melting	\$35.00
No. 1 bundles	35.00
No. 2 bundles	34.50
Mechanical bundles	33.00
Mixed steel scrap	31.00
Mixed bor. and turn.	32.00
Rails, remelting	35.00
Rails, rerolling	33.00
Bushelings	30.00
Bush., new fact. prep'd.	33.00
Bush., new fact. unprep'd.	32.00
Short steel turnings	50.00
Cast scrap	30.00

to 21.00
to 21.00
to 26.00
to 26.00
to 38.00
to 38.00
to 34.00

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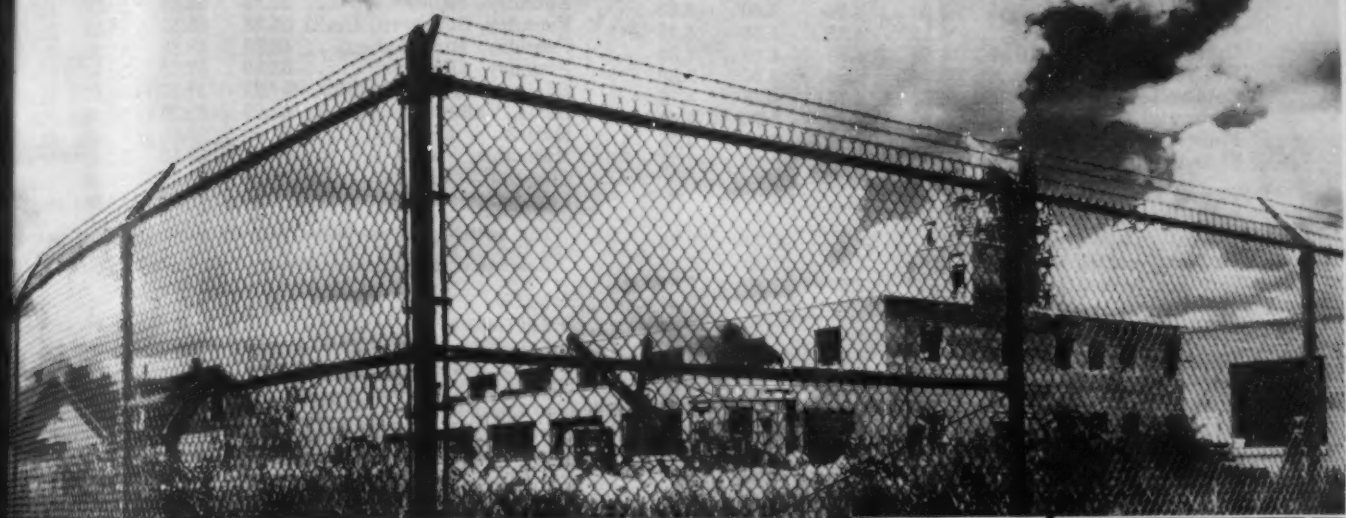
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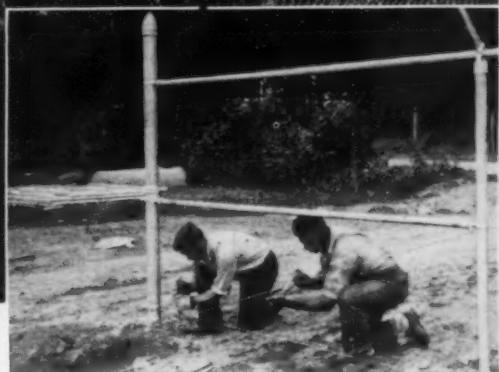
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1952



PROVIDE YOUR OWN SECURITY PROGRAM with ^{*}CONTINENTAL *Chain Link* FENCE...

Today, every plant needs security protection—to guard against dollar losses—to prevent sabotage, thievery and accidents. There is no substitute for a sturdy, long-lasting chain link fence to provide maximum safety for minimum investment. Continental chain link fence is well known for its staying-power. This rugged, open hearth steel fence is weather-proofed, after weaving, in a bath of hot zinc. There's a lifetime of protection and peace-of-mind in every foot of Continental chain link fence. Write for our free fence manual . . . or contact the nearest Continental sales office . . . find out how Continental fence can give you a low-cost security program.



Continental's experienced fence engineers help you plan and lay out fence, tailored to fit your property.



Line posts are solidly set in concrete—fabric carefully stretched and secured for permanence.

*TRADE MARK REG. U.S. PAT. OFF.



CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF Manufacturer's Wire in many sizes, gauges, tempers and finishes, including Galvanized,

KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire.

ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel:	Aug. 5, 1952	July 29, 1952	July 8, 1952	Aug. 7, 1951
(cents per pound)				
Hot-rolled sheets	3.60	3.60	3.60	3.60
Cold-rolled sheets	4.35	4.35	4.35	4.35
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.80
Hot-rolled strip	3.50	3.50	3.50	3.50
Cold-rolled strip	4.75	4.75	4.75	4.75
Plate	3.70	3.70	3.70	3.70
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302) ..	36.75	36.75	36.75	36.75

Tin and Terneplate:	Aug. 5, 1952	July 29, 1952	July 8, 1952	Aug. 7, 1951
(dollars per base box)				
Tinplate (1.50 lb.) cokes ..	\$8.70	\$8.70	\$8.70	\$8.70
Tinplate, electro (0.50 lb.) ..	7.40	7.40	7.40	7.40
Special coated mfg. ternes ..	7.50	7.50	7.50	7.50

Bars and Shapes:	Aug. 5, 1952	July 29, 1952	July 8, 1952	Aug. 7, 1951
(cents per pound)				
Merchant bars	3.70	3.70	3.70	3.70
Cold finished bars	4.55	4.55	4.55	4.55
Alloy bars	4.30	4.30	4.30	4.30
Structural shapes	3.65	3.65	3.65	3.65
Stainless bars (No. 302) ..	31.50	31.50	31.50	31.50
Wrought iron bars	9.50	9.50	9.50	9.50

Wire	Aug. 5, 1952	July 29, 1952	July 8, 1952	Aug. 7, 1951
(cents per pound)				
Bright wire	4.85	4.85	4.85	4.85

Rails	Aug. 5, 1952	July 29, 1952	July 8, 1952	Aug. 7, 1951
(dollars per 100 lb)				
Heavy rails	\$3.60	\$3.60	\$3.60	\$3.60
Light rails	4.00	4.00	4.00	4.00

Semifinished Steel:	Aug. 5, 1952	July 29, 1952	July 8, 1952	Aug. 7, 1951
(dollars per net ton)				
Rerolling billets	\$56.00	\$56.00	\$56.00	\$56.00
Slabs, rerolling	56.00	56.00	56.00	56.00
Forging billets	66.00	66.00	66.00	66.00
Alloy blooms, billets, slabs ..	70.00	70.00	70.00	70.00

Wire Rod and Skelp:	Aug. 5, 1952	July 29, 1952	July 8, 1952	Aug. 7, 1951
(cents per pound)				
Wire rods	4.10	4.10	4.10	4.10
Skelp	3.35	3.35	3.35	3.35

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron:	Aug. 5, 1952	July 29, 1952	July 8, 1952	Aug. 7, 1951
(per gross ton)				
Foundry, del'd Phila.	\$58.19	\$58.19	\$58.19	\$57.77
Foundry, Valley	52.50	52.50	52.50	52.50
Foundry, Southern, Cin'ti ..	55.58	55.58	55.58	55.58
Foundry, Birmingham ..	48.88	48.88	48.88	48.88
Foundry, Chicago†	52.50	52.50	52.50	52.50
Basic, del'd Philadelphia. ..	57.27	57.27	57.27	56.92
Basic, Valley furnace ...	52.00	52.00	52.00	52.00
Malleable, Chicago†	52.50	52.50	52.50	52.50
Malleable, Valley	52.50	52.50	52.50	52.50
Charcoal, Chicago	70.56	70.56	70.56	70.56
Ferromanganese†	186.25	186.25	186.25	186.25

†The switching charges for delivery to foundries in the Chicago district is \$1 per ton.
‡Average of U. S. prices quoted on Ferroalloy pages.

Scrap:	Aug. 5, 1952	July 29, 1952	July 8, 1952	Aug. 7, 1951
(per gross ton)				
No. 1 steel, Pittsburgh...	\$43.00*	\$43.00*	\$39.50	\$44.00*
No. 1 steel, Phila. area..	41.50*	40.75	40.50	42.50*
No. 1 steel, Chicago ...	41.50*	41.50	38.50	42.50*
No. 1 bundles, Detroit...	41.15*	41.15*	41.15*	41.15*
Low phos. Young'n.....	46.50*	46.50*	46.50*	46.50*
No. 1 cast, Pittsburgh...	46.75	46.25	42.00	49.00†
No. 1 cast, Philadelphia..	45.50	41.50	38.50	49.00†
No. 1 cast, Chicago	44.50	42.50	39.50	49.00†

*Basing pt., not including broker's fee.
†Shipping pt., not including broker's fee.

Coke: Connellsville:	Aug. 5, 1952	July 29, 1952	July 8, 1952	Aug. 7, 1951
(per net ton at oven)				
Furnace coke, prompt...	\$14.75	\$14.75	\$14.75	\$14.75
Foundry coke, prompt...	17.75	17.75	17.75	17.75

Nonferrous Metals:	Aug. 5, 1952	July 29, 1952	July 8, 1952	Aug. 7, 1951
(cents per pound to large buyers)				
Copper, electro, Conn. ...	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York...	\$1.215	\$1.215	\$1.215	\$1.03
Zinc, East St. Louis ...	15.00	15.00	15.00	17.50
Lead, St. Louis	15.80	15.80	15.80	16.80
Aluminum, virgin	19.00	19.00	19.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	59.58
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex..	39.00	39.00	39.00	42.00

[Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)]

Composite Prices

Finished Steel Base Price

Aug. 5, 1952.....	4.131¢ per lb.....
One week ago.....	4.131¢ per lb.....
One month ago.....	4.131¢ per lb.....
One year ago.....	4.131¢ per lb.....

	High	Low
1952....	4.131¢ Jan. 1	4.131¢ Jan. 1
1951....	4.131¢ Jan. 2	4.131¢ Jan. 2
1950....	4.131¢ Dec. 1	3.837¢ Jan. 3
1949....	3.837¢ Dec. 27	3.705¢ May 3
1948....	3.721¢ July 27	3.193¢ Jan. 1
1947....	3.193¢ July 29	2.848¢ Jan. 1
1946....	2.848¢ Dec. 31	2.464¢ Jan. 1
1945....	2.464¢ May 29	2.396¢ Jan. 1
1944....	2.396¢	2.396¢
1943....	2.396¢	2.396¢
1942....	2.396¢	2.396¢
1941....	2.396¢	2.396¢
1940....	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939....	2.35367¢ Jan. 3	2.27207¢ May 16
1938....	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937....	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936....	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1929....	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Pig Iron

.....	\$52.77 per gross ton....
.....	52.77 per gross ton....
.....	52.77 per gross ton....
.....	52.69 per gross ton....

	High	Low
52.77 May 2	52.72 Jan. 1	52.72 Jan. 1
52.72 Oct. 9	52.69 Jan. 2	52.69 Jan. 2
52.69 Dec. 12	45.88 Jan. 3	45.88 Jan. 3
46.87 Jan. 18	45.88 Sept. 6	45.88 Sept. 6
46.91 Oct. 12	39.58 Jan. 6	39.58 Jan. 6
37.98 Dec. 30	30.14 Jan. 7	30.14 Jan. 7
30.14 Dec. 10	25.37 Jan. 1	25.37 Jan. 1
25.37 Oct. 23	23.61 Jan. 2	23.61 Jan. 2
\$23.61	\$23.61	\$23.61
23.61	23.61	23.61
23.61	23.61	23.61
\$23.61 Mar. 20	\$23.45 Jan. 2	\$23.45 Jan. 2
23.45 Dec. 23	22.61 Jan. 2	22.61 Jan. 2
22.61 Sept. 19	20.61 Sept. 12	20.61 Sept. 12
23.25 June 21	19.61 July 6	19.61 July 6
32.25 Mar. 9	20.25 Feb. 16	20.25 Feb. 16
19.74 Nov. 24	18.73 Aug. 11	18.73 Aug. 11
18.71 May 14	18.21 Dec. 17	18.21 Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Scrap Steel

.....	\$42.00 per gross ton.....
.....	41.75 per gross ton.....
.....	39.50 per gross ton.....
.....	43.00 per gross ton.....

	High	Low
\$42.00 Jan. 1	\$39.17 July 1	\$39.17 July 1
47.75 Jan. 30	42.00 Oct. 28	42.00 Oct. 28
45.13 Dec. 19	26.25 Jan. 3	26.25 Jan. 3
43.00 Jan. 4	19.33 June 28	19.33 June 28
43.16 July 27	39.75 Mar. 9	39.75 Mar. 9
42.58 Oct. 28	29.50 May 20	29.50 May 20
31.17 Dec. 24	19.17 Jan. 1	19.17 Jan. 1
19.17 Jan. 2	18.92 May 22	18.92 May 22
19.17 Jan. 11	15.76 Oct. 24	15.76 Oct. 24
\$19.17	\$19.17	\$19.17
19.17	19.17	19.17
\$22.00 Jan. 7	\$18.92 May 22	\$18.92 May 22
21.83 Dec. 30	16.04 Apr. 9	16.04 Apr. 9
22.50 Oct. 3	14.08 May 16	14.08 May 16
15.00 Nov. 22	11.00 June 7	11.00 June 7
21.92 Mar. 30	12.67 June 9	12.67 June 9
17.75 Dec. 21	12.67 June 8	12.67 June 8
17.58 Jan. 29	14.08 Dec. 8	14.08 Dec. 8

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

in Heavy

8, Aug. 7,
1951
\$57.77
52.50
55.58
48.88
52.50
56.92
52.00
52.50
52.50
70.56
186.25

the Chi-

\$44.00*
42.50*
42.50*
41.15*
46.50*
49.00†
49.00†
49.00†

\$14.75
17.75

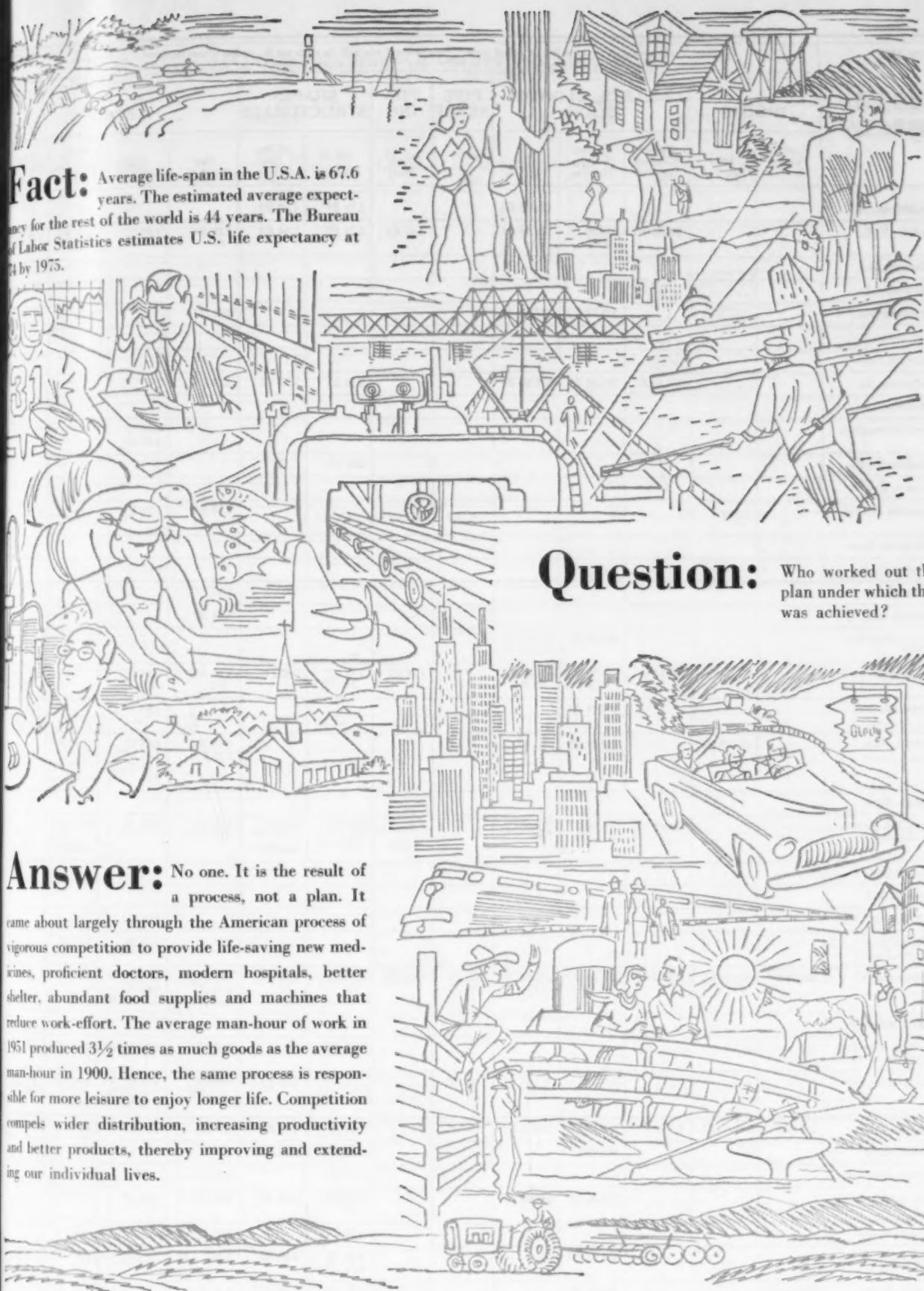
24.50
24.625
\$1.03
17.50
16.80
19.00
59.58
24.50
42.00

and steel
is used
in 1937
quarterly
(See

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W
July 1
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Jan. 3
June 28
Mar. 9
May 20
Jan. 1
May 22
Oct. 24
17

17
May 22
Apr. 9
May 16
June 7
June 8
June 8
Dec. 8
melting
summers
and Chi-



Fact: Average life-span in the U.S.A. is 67.6 years. The estimated average expectancy for the rest of the world is 44 years. The Bureau of Labor Statistics estimates U.S. life expectancy at 74 by 1975.

Question: Who worked out the plan under which this was achieved?

Answer: No one. It is the result of a process, not a plan. It came about largely through the American process of vigorous competition to provide life-saving new medicines, proficient doctors, modern hospitals, better shelter, abundant food supplies and machines that reduce work-effort. The average man-hour of work in 1951 produced $3\frac{1}{2}$ times as much goods as the average man-hour in 1900. Hence, the same process is responsible for more leisure to enjoy longer life. Competition compels wider distribution, increasing productivity and better products, thereby improving and extending our individual lives.

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THE COMPETITIVE SYSTEM DELIVERS THE MOST TO THE GREATEST NUMBER OF PEOPLE

August 7, 1952

169

IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply. New prices, effective July 26, will be billed later. Prices are approximately 4.7 pct higher than shown.

STEEL PRICES

		INGOTS		BILLETS, BLOOMS, SLABS		PIPE SKELP	PIL-ING	SHAPES STRUCTURALS		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Steel Sheet	Carbon	Hi Str. Low Alloy	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.					\$70.00 B3		3.70 B3	5.50 B3				
	Buffalo, N. Y.			\$56.00 B3	\$66.00 B3, R3	\$70.00 B3, R3	4.45 B3	3.70 B3	5.50 B3	3.50 B3, R3	4.65 B3	4.95 B3	6.40 B3
	Claymont, Del.												
	Coatesville, Pa.												
	Consheocken, Pa.				\$73.00 A2	\$77.00 A2				3.90 A2		5.55 A2	
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.			\$56.00 B3	\$66.00 B3	\$70.00 B3		3.70 B3	5.50 B3	3.50 B3			
	Newark, N. J.												
	New Haven, Conn.										5.15 A5 5.85 D1		
	Phoenixville, Pa.							5.90 P2					
	Putnam, Conn.												
	Sparrows Pt., Md.									3.50 B3	4.65 B3	4.95 A5, B3	6.40 B3
	Worcester, Mass.												
	Trenton, N. J.										6.00 R4		
MIDDLE WEST	Alton, Ill.									3.95 L1			
	Ashland, Ky.									3.50 A7			
	Canton-Massillon, Ohio				\$66.00 R3	\$70.00 R3 \$66.00 T5							
	Chicago, Ill.			\$56.00 U1	\$66.00 U1, R3, W8	\$70.00 U1, R3, W8	4.45 U1	3.65 U1, W8	5.50 U1	3.50 A1, W8	4.90 A1, I3		
	Cleveland, Ohio				\$66.00 R3						4.65 A5, J3		6.55 A5 6.70 J3
	Detroit, Mich.		\$54.00 R5		\$69.00 R5	\$73.00 R5				4.40 M2 3.80 G3	4.85 G3 5.45 M2 5.60 R5, D1, D2	5.95 G3	
	Duluth, Minn.												
	Gary, Ind. Harbor, Indiana			\$56.00 U1	\$66.00 U1	\$70.00 U1, Y1	4.45 I3	3.65 U1, I3	5.50 U1, I3 6.00 Y1	3.50 U1, Y1, I3	4.90 I3	5.30 U1, I3 5.80 Y1	
	Granite City, Ill.												
	Kokomo, Ind.												
	Middletown Ohio										4.65 A7		
	Niles, Ohio Sharon, Pa.									4.00 S1	5.35 S1	5.40 S1	6.55 S1
	Pittsburgh, Pa.	\$52.00 U1	\$54.00 U1, C11	\$56.00 U1	\$66.00 U1	\$70.00 U1, C11	3.35 U1 3.45 J3	4.45 U1	3.65 U1, J3	5.50 U1, J3	4.00 S9, S7 3.75 A3 3.50 J3, A7	4.65 J3, A7 5.00 A3 5.35 B4, S7	
	Portsmouth, Ohio												
	Weirton, Wheeling, Follansbee, W. Va.							3.90 W3		3.60 W3	4.65 W3, F3	5.75 W3	7.20 W3
	Youngstown, Ohio					\$70.00 Y1, C10	3.35 U1, R3		6.00 Y1	3.50 U1, R3, Y1	4.65 R3, Y1 5.25 C5, T4 5.35 B4	5.30 U1, R3 5.80 Y1	6.55 R3 7.05 Y1
WEST	Fontana, Cal.	\$79.00 K1	\$80.00 K1	\$75.00 K1	\$85.00 K1	\$89.00 K1		4.25 K1	6.10 K1	4.75 K1	6.30 K1	6.20 K1	6.95 K1
	Geneva, Utah				\$66.00 C7			3.65 C7	5.50 C7				
	Kansas City, Mo.							4.25 S2		4.10 S2			
	Los Angeles, Calif.				\$85.00 B2	\$90.00 B2		4.25 B2, C7	6.05 B2	4.25 B2, C7	6.40 C1	6.05 B2	
	Minneapolis, Colo.							4.10 C6		4.55 C6			
	San Francisco, Cal. Niles, Cal.				\$85.00 B2			4.20 B2 4.56 P9	6.00 B2	4.25 C7, B2		6.05 B2	
	Seattle, Wash.	\$73.00 S11			\$85.00 B2			4.30 B2	6.10 B2	4.50 B2		6.30 B2	
SOUTH	Atlanta, Ga.									4.05 A8			
	Birmingham, Ala. Alabama City, Ala.			\$56.00 T2	\$66.00 T2			3.65 R3, T2	5.50 T2	3.50 R3, T2		5.30 T2	
	Houston, Texas		\$62.00 S2		\$74.00 S2	\$78.00 S2		4.05 S2		3.90 S2			

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply. New prices, effective July 26, will be billed later. Prices are approximately 4.7 oct higher than shown.

IRON AGE

STEEL PRICES

SHEETS										WIRE ROD	TINPLATE†		BLACK PLATE	
Hot-rolled 18 ga. & byr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Tens 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.			Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.	
1.00 B3	4.35 B3				5.40 B3	6.55 B3			4.10 W6					Bethlehem, Pa.
														Buffalo, N. Y.
														Claymont, Del.
														Coatesville, Pa.
4.00 A2					5.65 A2									Conshohocken, Pa.
														Harrisburg, Pa.
														Hartford, Conn.
									4.10 B3					Johnstown, Pa.
														Newark, N. J.
														New Haven, Conn.
														Phoenixville, Pa.
														Puimam, Conn.
1.00 B3	4.35 B3	4.80 B3			5.40 B3	6.55 B3	6.75 B3		4.20 B3	\$8.55 B3	\$7.25 B3			Sparrows Pt., Md.
									4.40 A5					Worcester, Mass.
									4.20 R4					Trenton, N. J.
									4.40 L1					Altan, Ill.
1.00 A7		4.80 A7	4.65 A7											Ashland, Ky.
		4.80 R3												Canton-Massillon, Ohio
1.00 W8					5.40 U1				4.10 A5, R3, N4					Chicago, Ill.
1.00 R3, J3	4.35 R3, J3		4.65 R3		5.40 R3, J3	6.55 R3, J3			4.10 A5					Cleveland, Ohio
1.00 G3 4.00 M3	4.55 G3				5.95 G3	7.10 G3								Detroit, Mich.
														Duluth, Minn.
1.00 U1, V1, J3	4.35 U1, V1, J3	4.80 U1, J3	4.65 U1, J3	5.20 U1	5.40 U1, J3 5.90 Y1	6.55 U1, J3 7.05 Y1		5.40 J3	4.10 Y1	\$8.45 J3, U1, Y1	\$7.15 U1, J3	5.85 U1 5.30 Y1		Gary, Ind. Harbor, Indiana
4.30 G2	5.05 G2	5.50 G2	5.35 G2											Granite City, Ill.
		5.20 C9												Kokomo, Ind.
	4.35 A7		4.65 A7	5.20 A7										Middletown, Ohio
5.25 N3 4.00 S1		6.00 N3		6.00 N3	5.40 S1									Niles, Ohio
														Sharon, Pa.
1.00 U1, J3, A7 1.75 A3	4.35 U1, J3, A7	4.80 U1	4.65 U1		5.40 U1, J3	6.55 U1, J3	7.20 U1		4.10 A5 4.30 P6	\$8.45 U1, J3	\$7.15 U1, J3	5.85 U1		Pittsburgh, Pa.
									4.30 P7					Portsmouth, Ohio
1.00 W3, W5	5.35 F3 4.35 W3, W5	4.80 W3, W5		5.20 W3, W5	5.75 W3	6.90 W3				\$8.45 W3, W5	\$7.15 W3, W5	6.15 W5 5.85 F3		Weirton, Wheeling, Follansbee, W. Va.
1.00 U1, R3, Y1	4.35 R3, Y1	5.50 R1	4.65 Y1	6.05 E2	5.40 U1, R3 5.90 Y1	6.55 R3 7.05 Y1		6.05 R1, E2	4.10 Y1	\$8.45 R3	\$7.15 R3			Youngstown, Ohio
4.05 K1	5.30 K1				6.35 K1	7.50 K1			4.90 K1					Fontana, Cal.
1.70 C7														Geneva, Utah
														Kansas City, Mo.
4.30 C7		5.55 C7						5.40 C7	4.90 B2, C7	\$9.20 C7	\$7.90 C7			Los Angeles, Cal.
									4.35 C6					Minnequa, Colo.
4.30 C7	5.30 C7	5.55 C7												San Francisco, Cal.
														Niles, Cal.
														Seattle, Wash.
														Atlanta, Ga.
1.00 R3, T2	4.35 T2	4.80 R3, T2			5.40 T2			4.75 R3	4.10 R3, T2	\$8.55 T2	\$7.25 T2			Birmingham, Ala.
									4.50 S2					Alabama City, Ala.
														Houston, Texas

IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply. New prices, effective July 26, will be billed later. Prices are approximately 4.7 pct higher than shown.

STEEL PRICES

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg's. Bright
EAST	Bethlehem, Pa.				4.30 B3	5.40 B3	5.55 B3					
	Buffalo, N. Y.	3.70 B3,R3	3.70 B3,R3	4.60 B5	4.40 B3,R3	5.40 B3	5.55 B3	3.70 B3				4.85 W6
	Claymont, Del.							4.15 C4		4.85 C4		
	Coatesville, Pa.							4.15 L4		5.25 L4		
	Conshohocken, Pa.							4.15 A2	4.75 A2	5.05 A2	5.90 A2	
	Harrisburg, Pa.							6.30 C3	6.30 C3			
	Hartford, Conn.			5.10 R3		5.85 R3						
	Johnstown, Pa.	3.70 B3	3.70 B3		4.30 B3		5.55 B3	3.70 B3		4.75 B3	5.65 B3	4.85 B3
	Newark, N. J.			5.00 W10		5.75 W10						
	New Haven, Conn.											
	Phoenixville, Pa.											
	Putnam, Conn.			5.10 W10								
	Sparrows Point, Md.		3.70 B3					3.70 B3		4.75 B3	5.65 B3	4.95 B3
	Worcester, Mass.					5.75 A5						5.15 A5,W6
MIDDLE WEST	Trenton, N. J.											
	Alton, Ill.	4.15 L1										5.65 L1
	Ashland, Ky.							3.70 A7				
	Canton-Massillon	3.70 R3		4.55 R3,R2	3.95 T3 4.30 R3	4.90 T3 5.40 R3,R2						
	Chicago, Ill.	3.70 U1,R3, W8	3.70 R3	4.55 A5,B5, W8,W1	4.30 U1,R3 W8	5.40 R3 W8 W10,B5,L2 5.45 A5		3.70 U1,W8	4.75 U1	4.75 U1	5.65 U1	5.10 W7 4.85 R3,A5, K2,N4
	Cleveland, Ohio	3.70 R3	3.70 R3	4.55 A5,C13		5.45 A5	5.55 R3,J3	3.70 R3,J3	4.75 J3		5.65 R3,J3	4.85 A5,C13
	Detroit, Mich.	3.85 R5		4.70 P8,R5 4.80 P3	4.45 R5 4.65 C3	5.50 R5 5.55 P8 5.60 P3						
	Duluth, Minn.											4.85 A5
	Gary, Ind. Harbor, Indiana	3.70 U1, Y1, J3	3.70 U1, J3, Y1	4.55 R3,M5, L2	4.30 U1, J3, Y1	5.40 R3,M5, L2	5.55 U1, J3 6.05 Y1	3.70 U1, J3, Y1	4.75 J3	4.75 U1	5.65 U1, J3 6.15 Y1	5.10 M4
	Granite City, Ill.							4.40 G2				
	Kokomo, Ind.											4.95 C9
	Middletown, Ohio											
	Niles, Ohio Sharon, Pa.							3.95 S1		5.20 S1	5.70 S1	
WEST	Pittsburgh, Pa.	3.70 U1,J3	3.70 U1,J3	4.55 R3,A5, J3,S8,W10, C8	4.30 U1,C11	5.40 C11,S8, W10,C8,A5	5.55 U1,J3	3.70 U1,J3	4.75 U1	4.75 U1	5.65 U1,J3	4.85 A5,J3 5.10 P6
	Portsmouth, Ohio											5.25 P7
	Weirton, Wheeling, Follansbee, W. Va.	3.85 W3						4.00 W3,W5				
	Youngstown, Ohio	3.70 U1,R3, Y1	3.70 U1,R3, Y1	4.55 Y1,F2	4.30 U1, Y1, C10	5.40 Y1,C10, F2	5.55 U1 6.05 Y1	3.70 U1,R3, Y1			5.65 R3 6.15 Y1	4.85 Y1
	Fontana, Cal.	4.40 K1	4.40 K1		5.35 K1		6.60 K1	4.30 K1		5.70 K1	6.25 K1	
	Geneva, Utah							3.70 C7			5.65 C7	
	Kansas City, Mo.	4.30 S2	4.30 S2		4.90 S2							5.45 S2
	Los Angeles, Cal.	4.40 C7,B2	4.40 C7,B2		5.35 B2		6.25 B2					5.80 C7,B2
	Minnequa, Colo.	4.15 C6	4.50 C6					4.50 C6				5.10 C6
	San Francisco, Cal. Niles, Cal.	4.45 B2 4.40 C7 4.65 P9	4.45 B2 4.40 C7 4.65 P9				6.30 B2					5.80 C7
	Seattle, Wash.	4.45 B2	4.45 B2				6.30 B2	4.60 B2			6.55 B2	
	Atlanta, Ga.	4.25 A8	4.25 A8									5.10 A8
SOUTH	Birmingham, Ala. Alabama City, Ala.	3.70 R3,T2	3.70 R3,T2				5.55 T2	3.70 R3,T2			5.65 T2	4.85 R3,T2
	Houston, Tex.	4.10 S2	4.10 S2		4.70 S2			4.10 S2				5.25 S2

Key to Steel Producers

With Principal Offices

A1	Aarns Steel Co., Chicago
A2	Alan Wood Steel Co., Conshohocken, Pa.
A3	Allegheny Lanthan Steel Corp., Pittsburgh
A4	Allegheny Lanthan Steel Corp., Carnegie, Pa.
A5	American Steel & Wire Div., Cleveland
A6	Armstrong Steel Co., Middletown, O.
A7	Armed Steel Co., Atlanta, Ga.
A8	Atlantic Steel Co., Atlanta, Ga.
A9	Babcock & Wilcox Tube Co., Beaver Falls, Pa.
A10	Bethlehem Steel Co., Bethlehem, Pa.
A11	Bethlehem Steel Co., Bethlehem, Pa.
A12	Blue Strip Steel Co., New Castle, Pa.
A13	Blue & Laughlin Inc., Harvey, Ill.
A14	California Cold Rolled Steel Corp., Los Angeles
A15	Carpenter Steel Co., Reading, Pa.
A16	Central Iron & Steel Co., Harrisburg, Pa.
A17	Claymont Steel Corp., Claymont, Del.
A18	Cold Metal Products Co., Youngstown
A19	Colorado Fuel & Iron Corp., Denver
A20	Columbia-Geneva Steel Div., San Francisco
A21	Columbia Steel & Shifting Co., Pittsburgh
A22	Continental Steel Corp., Kokomo, Ind.
A23	Copperweld Steel Co., Glassport, Pa.
A24	Crucible Steel Co. of America, New York
A25	Cumberland Steel Co., Cumberland, Md.
A26	Cuyahoga Steel & Wire Co., Cleveland
A27	Detroit Steel Corp., Detroit
A28	Detroit Tube & Steel Div., Detroit
A29	Driver Harris Co., Harrison, N. J.
A30	Eastern Stainless Steel Corp., Baltimore
A31	Empire Steel Co., Mansfield, O.
A32	Fifth Sterling Steel & Carbide Corp., McKeesport, Pa.
A33	Fitzsimmons Steel Corp., Youngstown
A34	Follansbee Steel Corp., Follansbee, W. Va.
A35	Globe Iron Co., Jackson, O.
A36	Granite City Steel Co., Granite City, Ill.
A37	Great Lakes Steel Corp., Detroit
A38	Hanna Furnace Corp., Detroit
A39	Ingersoll Steel Div., Chicago
A40	Inland Steel Co., Chicago
A41	Interlake Iron Corp., Cleveland
A42	Jackson Iron & Steel Co., Jackson, O.
A43	Jones Steel Corp., Washington, Pa.
A44	Jones & Laughlin Steel Corp., Pittsburgh
A45	Judy Mfg. & Supply Co., Chicago
A46	Kaiser Corp., Oakland, Cal.
A47	Keystone Steel & Wire Co., Peoria
A48	Koppers Co., Granite City, Ill.
A49	Laclede Steel Co., St. Louis
A50	La Salle Steel Co., Chicago
A51	Lone Star Steel Co., Dallas
A52	Lukens Steel Co., Coatesville, Pa.
A53	Mahoning Valley Steel Co., Niles, O.
A54	McLouth Steel Corp., Detroit
A55	Mercer Tube & Mfg. Co., Sharon, Pa.
A56	Mid-States Steel & Wire Co., Crawfordsville, Ind.
A57	Monarch Steel Co., Inc., Hammond, Ind.
A58	Myrick Iron Works, Everett, Mass.
A59	National Supply Co., Pittsburgh
A60	National Tube Co., Pittsburgh
A61	Niles Rolling Mills Co., Niles, O.
A62	Northwestern Steel & Wire Co., Sterling, Ill.
A63	Oliver Iron & Steel Co., Pittsburgh
A64	Page Steel & Wire Div., Monessen, Pa.
A65	Phoenix Iron & Steel Co., Phoenixville, Pa.
A66	Plym Drawn Steel Div., Plymouth, Mich.
A67	Pittsburgh Coke & Chemical Co., Pittsburgh
A68	Pittsburgh Screw & Bolt Co., Pittsburgh
A69	Pittsburgh Steel Co., Pittsburgh
A70	Portsmouth Div., Detroit Steel Corp., Detroit
A71	Plymouth Steel Co., Detroit
A72	Pacific States Steel Co., Niles, Cal.
A73	Reeves Steel & Mfg. Co., Dover, O.
A74	Reliance Div., Eaton Mfg. Co., Massillon, O.
A75	Republic Steel Corp., Cleveland
A76	Robbing Sons Co. (John A.), Trenton, N. J.
A77	Rotary Electric Steel Co., Detroit
A78	Sharon Steel Corp., Sharon, Pa.
A79	Sheffield Steel Corp., Kansas City
A80	Shenango Furnace Co., Pittsburgh
A81	Simonds Saw & Steel Co., Fitchburg, Mass.
A82	Steele Sheffield Steel & Iron Co., Birmingham
A83	Standard Forging Corp., Chicago
A84	Stanley Works, New Britain, Conn.
A85	Superior Drawn Steel Co., Monaca, Pa.
A86	Superior Steel Corp., Carnegie, Pa.
A87	Sweet's Steel Co., Williamsport, Pa.
A88	Sidell-Butler Steel Rolling Mills, Seattle
A89	Tonawanda Iron Div., N. Tonawanda, N. Y.
A90	Tennessee Coal, Iron & R. Co., Birmingham
A91	Tennessee Products & Chem. Corp., Nashville
A92	Thomas Steel Co., Warren, O.
A93	Timken Steel & Tube Div., Canton, O.
A94	Tremont Nail Co., Wareham, Mass.
A95	United States Steel Co., Pittsburgh
A96	Universal-Cyclops Steel Corp., Bridgeville, Pa.
A97	Wallingford Steel Co., Wallingford, Conn.
A98	Washington Steel Corp., Washington, Pa.
A99	Weirton Steel Co., Weirton, W. Va.
A100	Wheatland Tube Co., Wheatland, Pa.
A101	Wheeling Steel Corp., Wheeling, W. Va.
A102	Wickwire Spencer Steel Co., Buffalo
A103	Wilson Steel & Wire Co., Chicago
A104	Winconsin Steel Co., S. Chicago, Ill.
A105	Woodward Iron Co., Woodward, Ala.
A106	Wycoff Steel Co., Pittsburgh
A107	Youngstown Sheet & Tube Co., Youngstown

Steel Prices

WARE-HOUSES		Base price, f.o.b., dollars per 100 lb.											
		Sheets		Strip		Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled	Cold-Rolled (15 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 As rolled	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 As rolled
Chics	Delivery Charge												
Baltimore	.....	\$3.20	5.54-6.84-6.44-7.06	8.07	6.07	.....	6.17	6.17	6.05	6.67	.....	.....	.....
Birmingham	.....	.15	5.59	6.37	7.29-7.35	5.54	.....	5.85	5.70	5.52	7.60	.....	.....
Boston	.....	.20	6.25	7.03	8.24-8.25	6.20	7.74-8.70	6.38-6.63	6.25	6.10-6.61	10.25-10.30	10.55-10.63	11.95-12.15
Buffalo	.....	.20	5.50-5.54	6.28-6.32	8.06-8.20	5.06	.....	5.89-5.98	5.80-5.82	5.52-5.55	6.18-6.45	10.15-10.45	11.80-12.10
Chicago	.....	.20	5.54	6.32	7.05-7.70	5.49	.....	5.65-5.79	5.65	5.47	6.05-6.30	10.10-10.10	11.75-11.75
Cincinnati	.....	.15	5.87	6.39	8.12	5.79	.....	6.17	6.12	5.77	6.66	.....	12.22
Cleveland	.....	.20	5.52-5.54	6.32-7.96	7.79-8.88	5.66-5.88	.....	5.82-5.83	5.95-6.16	5.54-5.61	6.15-6.40	10.21-10.37	11.86-12.12
Detroit	.....	.20	5.74	6.73	8.19-8.75	5.75	.....	6.17	6.32	6.38	6.30	10.95-11.12	11.40-12.62
Houston	.....	.20	6.35	7.37	8.57	6.18	.....	6.42	6.35	8.63	.....	11.25-12.90	.....
Indianapolis	.....	del'd.	5.94	6.02	8.25	5.80	.....	6.10	6.05	5.87	6.80	10.50	.....
Kansas City	.....	.20	6.22-6.40	7.64-7.68	8.66-8.70	6.10-6.90	7.81	6.38-6.74	6.43-6.48	6.20-7.22	7.01-7.15	10.00-10.10	11.50-11.80
Los Angeles	.....	.20	6.35	8.15	9.25-9.36	6.40	10.45	6.30-6.50	6.30	6.25-6.35	6.15-6.35	11.30-11.60	13.05-13.30
Memphis	.....	.10	6.25	7.03	7.51	6.20	.....	6.36	6.36	6.33	7.11	.....	.....
Milwaukee	.....	.20	5.71	6.48	7.82-7.86	5.66	.....	5.81-5.87	5.82	5.64	6.31-6.57	10.17	.....
New Orleans	.....	.15	5.98	7.01	8.26	5.93	.....	6.09	6.09	5.91	7.02	.....	.....
New York	.....	.30	6.09-6.52	6.90-7.08	8.07-8.33	6.36-7.19	7.67	6.47-6.88	6.39-6.40	6.22-6.42	7.03-7.58	10.45-10.75	12.10-12.40
Norfolk	.....	.20	6.68	.....	.....	6.33	.....	6.20	6.20	5.95	7.30	.....	.....
Philadelphia	.....	.25	5.84-6.07	6.80-7.22	7.95-8.00	6.04-6.06	7.15	6.05-6.19	5.86-6.09	6.14-6.27	6.96-7.16	9.82-10.17	11.82-12.12
Pittsburgh	.....	.20	5.54	6.32	7.70-8.05	5.89-5.62	.....	5.65-5.70	5.65	5.47	6.15-6.40	10.10	11.75
Portland	.....	.20	7.25	8.64-9.00	9.10-9.25	7.30	.....	6.80	7.88	7.00	8.65	.....	.....
Salt Lake City	.....	.20	7.95	.....	9.00-10.35	8.00	.....	7.45	7.60	7.95	.....	.....	.....
San Francisco	.....	.15	6.51-6.64	7.88-8.23	9.15-9.25	6.45-6.60	10.45	6.49-6.50	6.30-6.42	6.32-6.34	8.15-8.20	11.30-11.30	13.05-13.50
Seattle	.....	.20	6.96-7.01	7.84-8.98	9.50-9.55	7.55	.....	6.74-6.86	6.32-6.52	6.70-6.88	8.80-8.91	.....	.....
St. Louis	.....	.20	5.84	6.62	7.95-7.15	5.79	7.66	6.05-6.10	6.05-6.22	5.77-5.80	6.45-6.70	10.08-10.40	11.73-12.05
St. Paul	.....	.15	6.14	6.92	8.36	6.09	.....	6.25	6.25	6.07	6.75	.....	.....

* Metropolitan area delivery.

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

EXCEPTIONS: (1) 500 to 1499 lb.

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingot, re-rolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs, billets, re-rolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets, forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.80	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	36.50	37.00	39.00
Strip, hot-rolled	26.50	26.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip, cold-rolled	34.00	34.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2; (type 316 add 4.5¢) J2; Baltimore, Md.; Middletown, O., A7; Massillon, O., R3; Gary, Ind.; Bridgeville, Pa., U2; New Castle, Ind., J2; Ft. Wayne, Ind., J4; Lockport, N. Y., R4.
Strip: Midland, Pa., C11; Cleveland, Ohio, A3; Carnegie, Pa., 39; McKeesport, Pa., U1; Reading, Pa., C2; Washington, Pa., W2; (type 316 add 4.5¢) W; Lockport, Pa., A3; Bridgeville, Pa., U2; Detroit, Mich., M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, Ohio, C5; Lockport, N. Y., S4; Sharon, Pa., S1 (type 301 add 1/4¢); Butler, Pa., A7; Wallingford, Conn., W1.
Bars: Baltimore, Md.; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, Ill.; Chicago, Ill.; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, Ill.; Lockport, N. Y., S4; Canton, O., T5; Ft. Wayne, Ind., J4.
Wires: Waukegan, Ill.; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, Ind.; Harrison, N. J., D3; Baltimore, Md.; Dunkirk, N. Y.; Monaca, Pa.; Syracuse, N. Y.; Bridgeville, Pa., U2.
Structurals: Baltimore, Md.; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, N. Y., C11.
Plates: Brackenridge, Pa., A3 (type 416 add 1/4¢); Butler, Pa., A7; Chicago, Ill.; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., J2; Lockport, N. Y., S4; Middletown, Md.; Washington, Pa., J2; Cleveland, Massillon, R3.
Forged discs, die blocks, rings: Pittsburgh, Pa., C11; Syracuse, N. Y., C11; Ferndale, Mich., A3; Washington, Pa., J2.
Forging billets: Midland, Pa., C11; Baltimore, Md.; Washington, Pa., J2; McKeesport, Pa., F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, Ill.; Syracuse, N. Y., C11.
ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 series.
WASHINGTON STEEL—Slightly lower on 300 series except where noted.

RAILS, TRACK SUPPLIES

Fab. Mill Cents Per Lb.	No. 1 Std. Rail	Light Rail	Joint Bars	Track Spikes	Asas	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer UT...	3.60	4.00	4.70	6.15	...	...	...	...
Chicago R3...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Cleveland R3...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Eastley T2...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Fairfield T2...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Gary UT...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Ind. Harbor J3...	4.00	4.70	6.40	...	...	...	...	...
Johnstown B3...	4.00	4.70	6.40	...	...	...	...	...
Juliet UT...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Kansas City S2...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Lakewood B3...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Lebanon B3...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Minneapolis C3...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Pittsburgh R3...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Pittsburgh O1...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Pittsburgh P3...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Pittsburgh J3...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Port. Cal. C7...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Seattle B2...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Seattle B3...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
St. Louis Y7...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Terrace C7...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...
Youngstown R3...	3.60	4.00	4.70	6.15	5.00	4.50	9.00	...

TOOL STEEL

F.O.B. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	\$1.505
18	4	1	—	5	\$2.13
18	4	2	—	—	\$1.85
1.5	4	1.5	8	—	\$1.04
6	4	2	6	—	\$6.54
High-carbon chromium					\$6.54
Oil hardened manganese					\$5.4
Special carbon					\$2.54
Extra carbon					\$2.7
Regular carbon					\$2.4
Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.					

CLAD STEEL

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Costesville, Pa. L4	\$29.5	
Washington, Pa. J2	\$29.5	
Claymont, Del. C4	\$28.00	
Conshohocken, Pa. A2		\$27.50
New Castle, Ind. J2	\$29.77	\$26.24
Nickel-carbon		
10 pct Costesville, Pa. L4	32.5	
Inconel-carbon		
10 pct Costesville, Pa. L4	40.5	
Monel-carbon		
10 pct Costesville, Pa. L4	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. A4		77.00
Aluminized steel sheets, hot dip, Butler, Pa.		7.75
* Includes annealing and pickling, or sandblasting.		

ELECTRODES

Cents per lb, f.o.b., plant threaded electrodes with nipples, unboxed

Diam. in.	Length in.	Cents Per lb.
GRAPHITE		
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
5	40	21.50
4	40	23.61
3 1/2	24, 30	23.15
2	24, 30	25.36
CARBON		
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

FLUORSPAR

Washed gravel, f.o.b. Rosiclare, Ill.
Price, net ton; Effective CaF₂ content:
70% or more \$43.00
60% or less \$40.00

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For
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Speeds,
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Feeds

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Holders and ARMIDE (Carbide

Tipped) Cutters come in cased sets for tool rooms and maintenances departments, and individually in all sizes for general machine shop and production turning. They permit not only the ready machining of sand-filled castings, the hardest and toughest steels as well as many heretofore "unmachinable" materials, but also make practical much heavier cuts and cutting speeds up to 600 f.p.m. on ordinary work. They also run from 10 to 100 times as long between regrindings.

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ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

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One
man
and



a C-F Lifter...

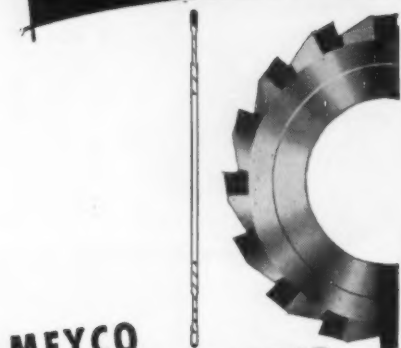
One man and a C-F Lifter handle the sheet steel stock in and out of storage in this plant with ease, speed and economy. C-F Lifters can pick up, carry and unload more loads per hour using less man and crane time than any other method. Note how closely a C-F Lifter piles sheets—this results in great savings in storage space. Jaw adjustments for carrying different widths of sheets are made in a few seconds by the operator—an important feature when varying sizes of stock are used. C-F Lifters are made in sizes to handle from 2 to 60 tons in standard and semi-special designs.

Write for the bulletin "C-F Lifters." It illustrates the many cost saving advantages of these lifters.

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1303 S. Kilbourn Ave., Chicago 23, Ill.

HANDLE SHEETS
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PRECISION CIRCULAR CUTTERS



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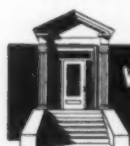


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Increase production in your slotting, venting and slitting operations by using MEYCO cutters. Please furnish complete specifications and quantities desired when requesting prices and indicate material to be cut.

Manufacturers of precision tools since 1888



**W. F. MEYERS CO., INC.
BEDFORD, INDIANA**

Miscellaneous Prices

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

	Pot Off List	Less	Reg.	K.	Less	Reg.	K.
		Keg.			Keg.		
1/4 in. & smaller.	15	28 1/2	15	28 1/2	15	28 1/2	21
9/16 in. & 5/8 in.	12	25	6 1/2	21	6 1/2	21	21
3/4 in. to 1 1/2 in.	9	23	1	16 1/2	1	16 1/2	16 1/2
Inclusive	9	23	1	16 1/2	1	16 1/2	16 1/2
1 1/2 in. & larger.	7 1/2	22	1	16 1/2	1	16 1/2	16 1/2

Nuts, Hot Pressed—Hexagon

1/4 in. & smaller.	26	37	22	34
9/16 in. & 5/8 in.	16 1/2	29 1/2	6 1/2	21
3/4 in. to 1 1/2 in.	12	25	2	17 1/2
Inclusive	12	25	2	17 1/2
1 1/2 in. & larger.	8 1/2	23	2	17 1/2

Nuts, Cold Punched—Hexagon

1/4 in. & smaller.	26	37	22	34
9/16 in. & 5/8 in.	23	35	17 1/2	30 1/2
3/4 in. to 1 1/2 in.	19 1/2	31 1/2	12	25
Inclusive	19 1/2	31 1/2	12	25
1 1/2 in. & larger.	8 1/2	23	2	17 1/2

Nuts, Semi-Finished—Hexagon

	Reg.	Hvy.
1/4 in. & smaller.	35	45
9/16 in. & 5/8 in.	23	35
3/4 in. to 1 1/2 in.	19 1/2	31 1/2
Inclusive	24	36
1 1/2 in. & larger.	13	26
	Light	8 1/2
7/16 in. & smaller.	35	45
1/4 in. thru 5/8 in.	23 1/2	39 1/2
3/4 in. to 1 1/2 in.	19 1/2	31 1/2
Inclusive	26	37

Stove Bolts

	Pot Off List
Packaged, steel, plain finished.	48—10
Packaged, plate finish	31—10
Bulk, plain finish	62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

	Base per 100 lb
1/2 in. & larger	\$7.85

Cap and Set Screws

	Pot Off List
(In bulk)	
Hexagon head cap screws, coarse or fine thread, 1/4 in. thru 5/8 in. x 6 in., SAE 1020, bright	54
1/4 in. thru 1 in. up to & including 6 in. x 6 in. & shorter	48
1/4 in. thru 1 in. up to & including 6 in. x 6 in. & shorter	46
high C double heat treat	41
1/4 in. thru 1 in. up to & including 6 in. x 6 in. & shorter	35
Milled studs	16
Flat head cap screws, listed sizes	34
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

Machine and Carriage Bolts

	Pot Off List
	Less Case C.
1/2 in. & smaller x 6 in. & shorter	15
9/16 in. & 5/8 in. x 6 in. & shorter	18 1/2
3/4 in. & larger x 6 in. & shorter	17 1/2
All diam. longer than 6 in.	14
Lag, all diam. x 6 in. & shorter	23
Lag, all diam. longer than 6 in.	21
Plow bolts	34



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protective paper

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Chicago 6 • New York 17 • San Francisco 3

Miscellaneous Prices

REFRACTORIES

Fire Clay Brick

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5)	\$94.60
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	88.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, East- ern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chi- cago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.70

Chrome Brick

Per Net Ton

Standard chemically bonded Balt. Chester	\$82.00
---	---------

Magnesite Brick

Standard, Baltimore	\$104.00
Chemically bonded, Baltimore	93.00

Grain Magnesite

St. % - in. grains

Domestic, f.o.b. Baltimore in bulk fines removed	\$63.70
Domestic, f.o.b. Chewelah, Wash., in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsyl- vania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	\$13.75
--	---------

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered
lower Lake ports. 1952 prices not yet es-
tablished. 1951 prices were:

Old range, bessemer	\$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analyses, prices
will be increased or decreased as the case
may be for increases or decreases after
Dec. 2, 1950, in Lake vessel rates, upper
Lake rail freights, dock handling charges
and taxes thereon.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton
lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+ % Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+ % Fe	42.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+ % Fe	53.5¢
Hydrogen reduced iron, mi- nus 300 mesh, 98+ % Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.3+ % Fe	83.0¢ to \$1.48
Aluminum	31.5¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic, 10.75¢ plus metal value	
Copper, reduced	10.00¢ plus metal value
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quantity, del'd	\$3.50
Lead	7.5¢ to 12.0¢ plus metal value
Manganese	57.0¢
Molybdenum, 99%	\$2.75
Nickel, unannealed	88.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	38.5¢
Solder powder, 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	83.00¢
Stainless steel, 316	\$1.10
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	\$6.00
Zinc, 10 ton lots	23.0¢ to 30.5¢

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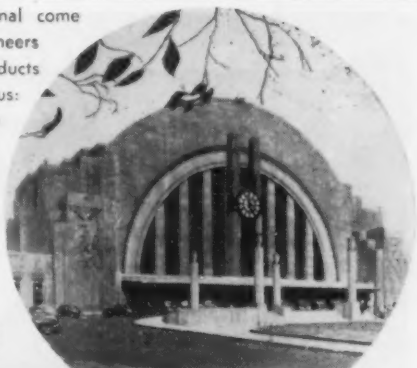
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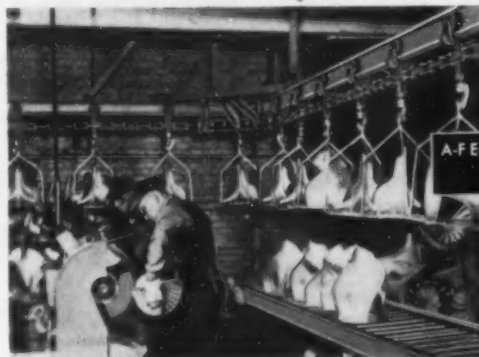


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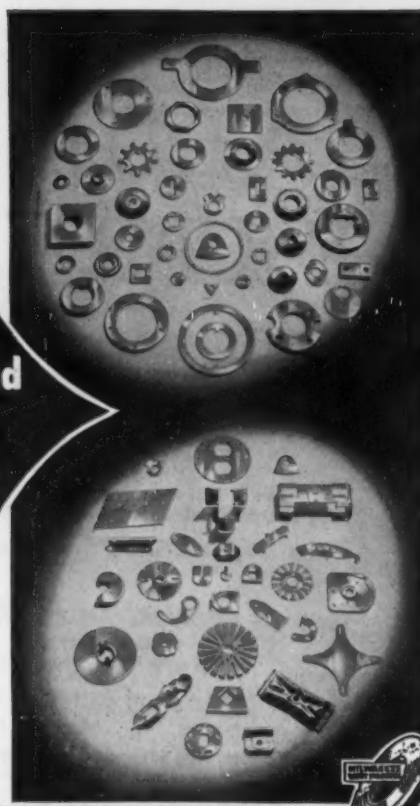
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In the reconstruction job on the famous old Brooklyn Bridge, **KRANE KARs** have been working on the demolition and rebuilding of the suspended spans and approaches. They have assisted in the removal of the entire wood block flooring, tracks, ties, etc., and have unloaded and erected approximately 4000 tons of structural steel and bridge grating. Now they are unloading mats, steel reinforcing bars, and structural steel . . . Lifting, Transporting, and Positioning this steel for the supports and new deck. Says Arthur J. Klevens of the Klevens Corp., General Contractors, "We're glad we have these **KRANE KARs**. They're doing a fine job."

1½, 2½, 5, and 10 ton capacities; gas or diesel, pneumatic or solid rubber tires, 9 to 37 ft. booms or adjustable telescopic booms; all-weather cabs, magnets, buckets, other accessories available. Thousands serving industrial plants throughout the world. Write for Bulletin No. 89 entitled, HOW TO CUT MATERIALS HANDLING COSTS.

SILENT HOIST & CRANE CO. 851 63rd ST., BROOKLYN 20, N.Y.



Ferroalloy Prices

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk in carloads delivered. (65-72% Cr, 2% max. Si.)
0.06% C . . . 30.50 0.20% C . . . 29.50
0.10% C . . . 30.00 0.50% C . . . 29.25
0.15% C . . . 29.75 1.00% C . . . 29.00
2.00% C . . . 28.75
65-69% Cr, 4-9% C . . . 28.75
62-66% Cr, 4-6% C, 6-9% Si . . . 27.60

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.
High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.
Carloads . . . 21.40
Ton lots . . . 22.75
Less ton lots . . . 25.35
Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.
Carloads . . . 27.75
Ton lots . . . 28.05
Less ton lots . . . 31.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.
0.10% max. C . . . 11.14
0.50% max. C . . . 1.10
9 to 11% C . . . 1.01

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.)
Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.
Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump delivered.
30-33% Ca, 60-65% Si, 3.00% max. Fe.
Carloads . . . 19.40
Ton lots . . . 22.10
Less ton lots . . . 23.40

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy lump, delivered.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads . . . 20.00
Ton lots . . . 22.30
Less ton lots . . . 23.30

CMSZ

Contract price, cents per lb of alloy, delivered.
Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.
Alloy 5: 50.56% Cr, 4-6% Mn, 13.5-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.
Ton lots . . . 24.75
Less ton lots . . . 22.40

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.
Ton lots . . . 17.50
Less ton lots . . . 19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.
Ton lots . . . 16.50
Less ton lots . . . 17.75

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. SI 48 to 52%, TI 9 to 11%, Ca 5 to 7%.
Carload packed . . . 18.90
Ton lots to carload packed . . . 19.00
Less ton lots . . . 20.50

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.
F.o.b. Niagara Falls, Alloy. W. Va., Ashtabula, O. \$185
F.o.b. Johnstown, Pa. \$187
F.o.b. Sheridan, Pa. \$188
F.o.b. Etina, Clairton, Pa. \$188
\$2.00 for each 1% above 82% Mn, penalty, \$2.15 for each 1% below 78%.
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.
Carload, bulk 10.95
Ton lots 12.55

Continued

Spiegeleisen

Contract prices gross ton; lump, f.o.b.
 16-19% Mn 19-21% Mn
 3% max. Si 3% max. Si
 Palmerton, Pa. \$74.00 \$75.00
 Pbb. or Chicago 74.00 75.00

Manganese Metal

Contract basis, 2 in. x down, cents per
 pound of metal, delivered.
 96% min. Mn, 0.2% max. C, 1% max.
 Si, 2.5% max. Fe.
 Carload, packed 34.75
 Ton lots 36.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed
 east of Mississippi, cents per pound.
 Carloads 28
 Ton lots 30
 Less ton lots 32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn con-
 tained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
17% max. C, 0.06% P, 90% Mn	26.25	28.10	29.20
0.07% max. C	25.75	27.60	28.80
0.15% max. C	25.25	27.10	28.30
0.30% max. C	24.75	26.60	27.80
0.50% max. C	24.25	26.10	27.30
0.75% max. C			
1.00% max. Si	21.25	23.10	24.30
Alster, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.			
Carloads			9.90
Ton lots			11.30
Calcium molybdate, 46.3-46.6% f.o.b. Langloeth, Pa., per pound contained Mo			\$1.15

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract
 price, carloads, lump, bulk, delivered, per
 lb of contained Mn 19.15¢

Silicomanganese

Contract basis, lump size, cents per
 pound of metal, delivered, 65-68% Mn,
 18-20% Si, 1.5% max. C. For 2% max. C,
 deduct 0.2¢.
 Carload bulk 9.90
 Ton lots 11.55
 Briquet, contract basis carlots, bulk
 delivered, per lb of briquet 11.15
 Ton lots 12.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk,
 Iowa, or Wenatchee, Wash., \$92.50 gross
 ton, freight allowed to normal trade area.
 Si 15.01 to 15.50 pct, f.o.b. Niagara Falls,
 N. Y., \$90.00. Add \$1.00 per ton for each
 additional 0.50% Si up to and including
 18%. Add \$1.00 for each 0.50% Mn over
 1%.

Silicon Metal

Contract price, cents per pound con-
 tained Si, lump size, delivered, for ton lots
 packed.
 96% Si, 2% Fe 18.00
 97% Si, 1% Fe 18.50

Silicon Briquets

Contract price, cents per pound of
 briquet bulk, delivered, 40% Si, 2 lb Si
 briquets.
 Carloads, bulk 6.95
 Ton lots 8.55

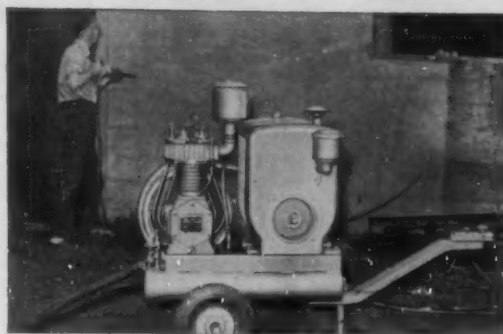
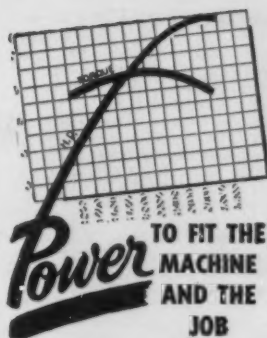
Electric Ferrosilicon

Contract price, cents per pound con-
 tained Si, lump, bulk, carloads, delivered.
 45% Si 20.00 75% Si 14.30
 50% Si 12.40 85% Si 15.55
 90-95% Si 17.00

Calcium Metal

Eastern zone contract prices, cents per
 pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	\$2.05	\$2.95	\$3.75
Less ton lots	2.40	3.30	4.55



WISCONSIN-POWERED Gardner-Denver Compressor

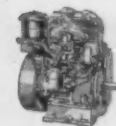
This Model TP0493LE Portable Compressor, made by Gardner-Denver Co., Quincy, Ill., is supplying air for the operation of a Model S17 Utility Drill, engaged in a plant maintenance job. Complete power reliance is placed on the Model TF 2-cylinder Wisconsin Heavy-Duty Air-Cooled Engine.

More and more builders of engine-driven equipment are discovering, to the satisfaction of themselves and their customers, that you can't do better than to specify "Wisconsin Engines"... for dependable power to fit both the machine and the job.

Available in a complete power range from 3 to 30 hp., in 4-cycle single cylinder, 2-cylinder and V-type 4-cylinder models, Wisconsin Air-Cooled Engines provide economical power, without waste, to meet the most exacting requirements. Look into them for your use.



4-cycle
Single Cyl.
3 to 9 hp.



4-cycle
2-Cyl.
7 to 13 hp.



V-type
4-Cyl.
15 to 30 hp.



WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

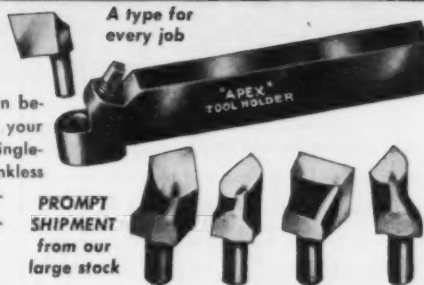
MILWAUKEE 46, WISCONSIN

APEX INSERTED-BLADE TOOLS METAL-CUTTING

APEX TOOL BITS FIT MOST STANDARD HOLDERS

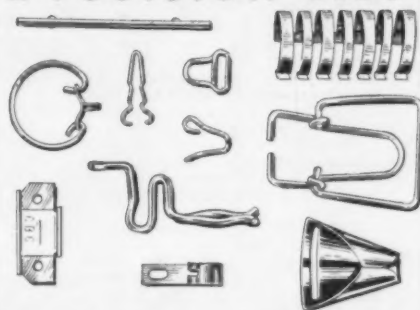
If you haven't yet changed to Apex, you can begin to get acquainted by using Apex Bits in your present holders. The Apex line includes Single-Point Round Shank (as shown) and Shankless Serrated — plus Inserted-Blade Milling Cutters of all different styles. Write for catalog.

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 SHELTON 12, CONNECTICUT



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large stock

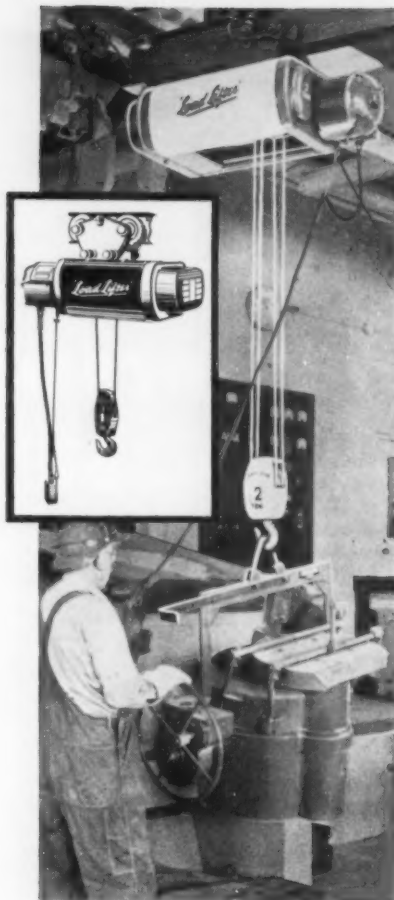
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Halt rising production costs. Make your load handling tops in efficiency. Use the "Series 700" "Load Lifter". This fast, powerful electric hoist lifts a ton one foot in two seconds at the push of a button.

Heat-treated helical gears, steel suspension, quick-acting load and motor brakes, non-fracturing load hook, only 24 volts at the push button — all these features assure dependable service and complete safety for man, load and hoist.

Boost defense and civilian output. Put the time and effort-saving "Load Lifter" Electric Hoist to work in your plant. Capacities: 1000 lbs. and up. Write for factful Bulletin 399.



'Load Lifter'

ELECTRIC HOISTS

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "Shaw-Box" Cranes, "Budgit" and "Load Lifter" Hoists and other lifting specialties. Makers of "Ashcroft" Gauges, "Hancock" Valves, "Consolidated" Safety and Relief Valves, and "American" Industrial Instruments.

Other Ferroalloys

Ferrocolumbium , 50-60% 2 in. x D, contract basis, delivered, per pound contained Cb.	
Ton lots	\$4.90
Less ton lots	4.95
Ferro-Tantalum-Columbium , 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta	\$3.75
Ferromolybdenum , 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	\$1.32
Ferrophosphorus , electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton	\$65.00
10 tons to less carload	\$75.00
Ferrotitanium , 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	\$1.35
Ferrotitanium , 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	\$1.50
Less ton lots	1.55
Ferrotitanium , 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton	\$177.00
Ferrotungsten , standard, lump or 3/4 x down, packed, per pound contained W5, ton lots, delivered	\$5.00
Ferrovandium , 35-55% contract basis, delivered, per pound, contained V.	
Openhearth	\$3.00-\$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25
Molybde oxide , briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.	\$1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa.	\$1.13
Simanal , 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk lump	14.50¢
Ton lots, bulk lump	15.75¢
Less ton lots, lump	16.25¢
Vanadium Pentoxide , 86-89% V ₂ O ₅ contract basis, per pound contained V ₂ O ₅	\$1.28
Zirconium , 35-40%, contract basis f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium , 12-15%, contract basis, lump, delivered, per lb of alloy.	
Carload, bulk	7.00¢
Boron Agents	
Borosil , contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B.	\$5.25
Bortam , f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Corbortam , Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.	
Ton lots, per pound	10.00¢
Ferroboron , 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots. ...	\$1.20
F.o.b. Wash., Pa.; 100 lb up	
10 to 14% B .....	.85
14 to 19% B	1.20
19% min. B	1.50
Grainal , f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	\$1.00
No. 6	68¢
No. 79	50¢
Manganese-Boron , 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd	
Ton lots	\$1.46
Less ton lots	1.57
Nickel-Boron , 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	\$1.80
Silicas , contract basis, delivered.	
Ton lots	45.00¢

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BAR STOCK

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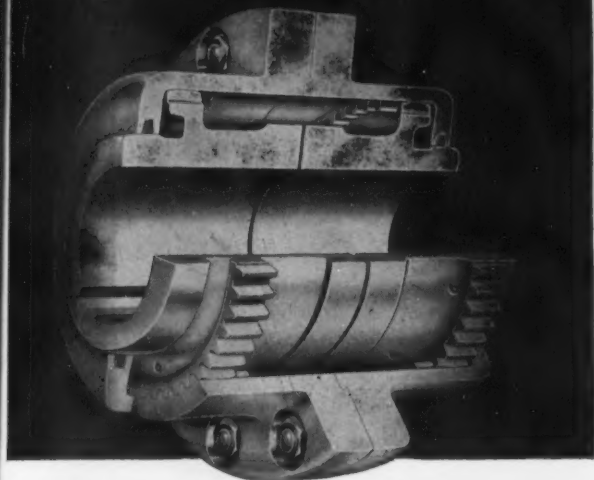
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machinery for all
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structural work

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PLAN FILES AND DRAWER UNITS

Files and units are sturdily constructed of selected oak. Drawers operate smoothly on wood drawer runs. Attractive oak finish. Flush or sanitary base.

Available in units of: 2 tool drawers and 1 shallow drawer, 2 tool drawers and 3 shallow drawers, or 5 shallow drawers—for table top widths of 36" or 42". One tool drawer is equipped with an individual lock.

Prompt delivery on any unit or combination. See your local dealer or write directly to factory.

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CONSIDER GOOD USED EQUIPMENT FIRST

BELT GRINDING UNIT

Hill Clutch & Machine & Fdy. Co. Open Side Abrasive Belt Grinding Unit. Designed to accommodate slabs up to $\frac{3}{4}$ " thick x 30" wide x 30' long.

BRAKE—LEAF TYPE

16' x $\frac{3}{4}$ " Drels. & Krump Leaf Type Bending Brake, Motor Driven with 40 H.P. A.C. Motor.

BUILDING

72'6" x 140' Steel Building—NEW—Designed for Corrugated Steel Siding and to carry load of 30 ton overhead electric traveling crane.

CHARGING MACHINE

6000 lb. Brosius Floor Type Gasoline Driven Charging Machine. Equipped with Peel, Gasoline Engine, Rubber Tires.

CRANES

5 ton Niles Crane 56' 3 $\frac{3}{4}$ " Span. Three motors, 440 volt, 3 phase, 60 cycle.

25 ton P&H Crane 80' Span. With 5 ton Auxiliary Four Motors 440 volt 3 phase 60 cycle. Built 1942-43 for outdoor service.

FLANGING MACHINE

$\frac{3}{4}$ " McCabe Pneumatic Flanging Machine, Pneumatic Holdowns, Circle Flanging Attachment.

FORGING MACHINE

5" Ajax Forging Machine or Upsetter, Motor driven. Equipped with Air Clutch.

FURNACE—BILLET HEATING

Surface Combustion Super Fast Heating Furnace Tangential Burner, 3 Section, Pusher Capacity 3600 lb. per hr. gross, Max. Temp. 2750° F. Complete Elec. Equip.

FURNACES—MELTING

400 lb. Moore Type "UT" Melting Furnace Top Charge. Complete with Transformer. New 1943—Little Used.

15 ton Harout Model V-12 Electric Melting Furnace Top Charge hydraulically operated. Complete with Transformer Equipment.

25 ton Moore Size "NT" Melting Furnace, with 7500 KVA Transformer 13,200 vo. 3 ph. 60 cy.

LEVELER—ROLLER

60" Aetna-Standard Roller Leveler, Motor Driven. 17 Rolls 4 $\frac{3}{4}$ " Dia.

PLANERS

48" x 48" x 20' Cincinnati, Four Head

48" x 48" x 12' Niles-Bement-Pond, Four Head

60" x 60" x 12' Niles-Bement-Pond, Four Head

72" x 72" x 12' Niles-Bement-Pond, Four Head

PLATING MACHINE

Type "B" Crown Full Automatic, Nickel & Chrome Plating Machine, Max. Work Size 16" wide x 36" deep x 4" thick.

PRESS—KNUCKLE JOINT

1000 ton Bliss #27 Knuckle Joint, Embossing & Colling Press, 2 $\frac{1}{2}$ " stroke, 18" Shut Height.

ROLLING MILLS

8" x 10" Schmitz Single Stand Two High With Friction Drive Rewinder.

12 $\frac{1}{2}$ " x 16" Philadelphia Two High Cold Rolling Mill. Complete with Pinion Stand, 75 H.P. Motor 440/3/60. Starter and Controls, Incl. Coller.

12 $\frac{1}{2}$ " x 20" Waterbury Farrel Single Stand Two High. Complete with Gear Reducer and 50 H.P. A.C. Motor.

18" x 24" Waterbury Farrel Two Stand Two High Rolling Mill. Complete with Elec. Equip.

STRAIGHTENERS

No. 3 Medart 3-Roll Straightening Machine Capacity 1" to 3 $\frac{1}{2}$ " Bars or 4 $\frac{1}{2}$ " O. D. Pipe or Tubing. NEW 1950.

No. 4 Kane & Roach 8-Roll Straightener Capacities 2" Rounds or Squares, 3x3x $\frac{3}{8}$ " Angles, 2 $\frac{1}{2}$ " Channels, etc.

TESTING MACHINE

300,000 lb. SOUTHWARK-EMERY Universal Hydraulic Testing Machine.

TRIMMING LINE

#1049 Torrington Trimming Line, With Feed Rolls and Scrap Cutter. Capacity for steel or aluminum alloys $\frac{1}{8}$ " max. Trimmed width 22" min. 66" max. Scrap Length $\frac{3}{4}$ " min. 2 $\frac{1}{4}$ " max.

UNIVERSAL IRONWORKERS

Ryerson Steel Frame Universal Iron Worker, M.D. Capacity Punch $\frac{3}{8}$ " thru $\frac{1}{2}$ ", Shear 1" Square 1 $\frac{1}{4}$ " Round, $\frac{1}{2}$ " x 4" Flat, 4 x 4 x $\frac{1}{4}$ " Angles.

No. 28U-30 Buffalo Armor Plate Universal Ironworker—Combination Punch, Shear & Bar Cutter, Motor Driven Capacities—Shear 3" Round, 2 $\frac{1}{2}$ " Square, 5x1 $\frac{1}{2}$ " Flat, 5x5x $\frac{1}{4}$ " Angles, 12"—31 $\frac{1}{2}$ " Beams, etc., Punch 1 $\frac{1}{2}$ " thru 1 $\frac{1}{4}$ ".

WELDERS

440 volt 60 cycle, Mechanical Contractor Hi-Pressure Clamp Assembly—NEW 1949.

250 KVA Progressive Model A-6 Flash Welder

ITTERBUSH & COMPANY, INC.

50 Church Street, New York 8, N. Y.
Phone—Cort 7-3437

The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

No Election—Settlement of the steel strike was not a cause for torchlight parades of used machine tool men around Chicago. For them, the lengthy strike was only a pebble disturbing the surface of an already muddy pond. Business, always slack in July and August, was not overly affected by the strike-caused production cutbacks made in many industries.

Contradicting the trend in most parts of the country, a few Chicago dealers even reported an upswing in sales during the last week in July. Business pickup resulted primarily from new small industrial plants which are in the market for light machine tools.

Rebuilders Inoculated—Chicago rebuilders likewise report a fair degree of immunity from infection by the steel strike. Their chief problem has been in trying to acquire highly tempered cold finished bars and channels. These items have never been in large supply, so most machine tool men are thoroughly experienced in ferreting out hidden caches of bars and channels. Cutoff of steel did not prove much of an additional burden.

Also machine tool men found their experience in making new parts from old helped to offset shortage problems.

Defense Doldrums—Despite the easing of machine tool cancellations for defense work, purchase of used tools by buyers working on military contracts continued to fall off. A check of renegotiation papers passing through dealers' hands shows that July was a poor month for defense business in Midwest. Dealers are watching hopefully for a possible increase in Air Force contract commitments.

Trade between dealers was still moving at a fairly lively clip. One of the larger equipment pieces to change hands in the Chicago area last week was a 2-in. capacity

Barnes hydraulic drill. Demand is stiff for certain types of equipment with one source reporting vertical mills as his hottest item on the basis of inquiries received.

Something Old—Chicago dealers and rebuilders continued to show ingenuity in making adaptations of old machines to meet the solid demand for heavy equipment. An example is the Emerman Machinery Corp., which received a gear cutting order that would have required purchase of a \$25,000 piece of new equipment if an old unit had not been readapted.

The company jacked up the axis of a 60 in. capacity gear cutter and boosted the unit's working diameter to 72 in. By making these simple changes, and with no work needed on the hob and grinding equipment, Emerman was able to handle the heavy gear cutting job.

Another of the firm's innovations is rebuilding small planers into grinders for milling machine tables. The first model built was a 12 ft x 84 in. x 84 in. unit for use in a steel mill near Chicago. The gadget proved so handy Emerman planned a smaller 36 x 36 x 96 in. model for its own use. In the talking stage is a plan to build a 24-ft planer into a grinder for bolster plates in heavy press construction.

No Way Out—Philadelphia dealers, like those in all other sections, are stumped in trying to meet the demand for late model machine tools which they haven't got. They fondly remember the days little more than a year ago when they were able to move virtual antiques ordered by small machine shops expecting a full-blown war and subsequent subcontracting orders.

As one dealer put it, business is "fair plus" but would be terrific if the desired used tools were available. Leading the demand list in the eastern Pennsylvania market are vertical boring mills and all sorts of turret lathes and milling machines in sizes 3, 4 and 5.